

January, 1925

THE JOURNAL OF THE
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RADIO IN THE HOME

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Illustrated by NEELY



In This Issue: The Counterflex Simplified

*Resonant Wood
insures
Tone Quality*

Music Master Gives Life to Radio Voices

WORLD fame comes to singers through a mysterious something in the voice—a personal quality that grips the hearers and holds them in a spell of delight.

When voices with delicate modulations and elusive sweetness of tone are broadcast, only a master instrument can reproduce them faithfully. Such an instrument is Music Master.

Two celebrated opera stars sing the Duet of the Flowers from *Madame Butterfly*. Hear the quality of greatness in their voices, as it can be heard only through Music Master.

Radio impulses entering the sensitive precision instrument in the base are translated into sound waves, undistorted and faithful to the original voice or instrument. In the tapered tone chamber of cast aluminum these sound waves grow clear and bell-like and, finally, the full, mature tones pour forth in rich resonance through the Music Master amplifying bell of natural wood.

Music Master is a musical instrument—the *musical instrument of radio*. Hear it at your dealer's or, better still, have one sent to your home to prove with your own set.

Dealers Everywhere

Connect Music Master in place of headphones.	Model VI, 14-inch bell. \$25
No batteries required.	Model VII, 21-inch bell \$35
No adjustments.	Model VIII, (cabinet type), with "Full Floating" Wood Horn \$75

Music Master Corporation

Makers and Distributors of High-Grade Radio Apparatus
Tenth and Cherry Streets
Chicago PHILADELPHIA Pittsburgh

Music Master

RADIO REPRODUCER





Of Course It's a CROSELEY Better-Costs Less Radio

"Oh boy! There's the west coast! Last night I had the east coast, and the night before that, Havana. I bet I get London soon. This Crosley sure does bring 'em in. I can tune out local stations any old time and get what I want. There's nothing like a Crosley!"

That's what thousands of men, women and boys are finding out every evening in all parts of the United States. So enthusiastic are they that hundreds of voluntary letters tell us daily of the really remarkable performances of Crosley Radios and the complete satisfaction that they give. Here is what a few of them say:

Parkersburg, W. Va. September 30, 1924.
"Wish to congratulate you on the one-tube Crosley 50. Have listened to Havana, Cuba, and as far west as Oakland, Los Angeles and San Francisco. This is what I call a wonderful set."

Rockville, Maryland. October 1, 1924.
"I thought it would interest you to know that on September 15th, I received Oakland, California on my two-tube Crosley 51. That station is 2,434 miles from here. I had a hard time making my friends believe it until I wrote to California and had them verify what I heard. As soon as I can afford it, I expect to get a Trirdyn."

Olney, Illinois. October 15, 1924.
"I'm getting stations from New York to Seattle, Wash., on my Trirdyn. Monday night, October 13th, I received clearly and plainly the announcer and music from Honolulu, Hawaiian Islands, 7,000 miles away. My machine is not for sale."

(Names above repeated)

**BEFORE YOU BUY—COMPARE
YOUR CHOICE WILL BE A CROSELEY**

For Sale By Good Dealers Everywhere

Crosley Regenerative Receivers are Licensed under Armstrong U. S. Patent 1,111,100
Prices West of the Rockies add 10%

Write for Complete Catalog

THE CROSELEY RADIO CORPORATION
Powel Crosley, Jr., President

160 Alfred Street

Cincinnati, Ohio

Crosley Owns and Operates Broadcasting Station W.L.N.



Crosley One Tube
Model 50, \$14.50
With tube and Crosley Phones \$22.25



Crosley Two Tube Model 51, \$18.50
With tubes and Crosley Phones \$30.25

Crosley
Head Phones
Better—Cost Less
\$3.75



Crosley Three Tube Model 52, \$30.00
With tubes and Crosley Phones \$45.75



Crosley Trirdyn Regular, \$65.00
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Crosley Trirdyn Special, \$75.00
With tubes and Crosley Phones \$90.75

Mail
This
Coupon
At Once

The Crosley
Radio Corp'n.
160 Alfred St.
Cincinnati, O.
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charge, your catalog
of Crosley receivers
and parts.

Name _____

Address _____

No. 772

45-volt

large

vertical

Price

\$3.75



No. 766

22 1/2-volt

large

horizontal

Price

\$2.00

*Dry "B" Batteries
are more economical
and more dependable
than any other
source of plate
current!*

Cut your operating cost

THIRTY years' experience in the manufacture of dry batteries has enabled us within the past two years to steadily and greatly improve dry "B" Battery quality. Eveready "B" Batteries are now from two to three times better than ever before.

Eveready "B" Batteries will long outlast any others, and are the most economical and dependable source of plate current. These are strong statements, but they have been proved by tests in our own and in independent laboratories. Check them for yourself on your own radio set. Get Eveready "B" Batteries.

There is an Eveready Radio Battery for every radio use.

Manufactured and guaranteed by
NATIONAL CARBON COMPANY, INC.
Headquarters for Radio Battery Information
New York San Francisco
Canadian National Carbon Co., Limited, Toronto, Ontario

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Radio Batteries
—they last longer

JANUARY
1925

Vol. III
No. VIII



This photograph is through the courtesy of the Zenith Radio Corporation

RADIO IN THE HOME

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RADIO IN THE HOME

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EDITORIALLY SPEAKING

By

Henry M. Neely

I HAVE not recently counted the letters in the huge pile of unanswered mail that is in my office, but every time I look at that pile I am reminded of the fact that there are many hundred readers of this magazine who feel that they have not been very well treated and that I might at least have had the courtesy to acknowledge receipt of their letters.

These letters all asked questions about some circuit. Most of them are about the circuits which we have published in this magazine; many of them are about other circuits and about manufactured sets.

These questions are asked by readers who are anxiously awaiting the advice which they have sought and I have not given that advice. I have failed them and there is no question that they feel hurt and that they are justified in feeling that way.

I just want to talk here for a very few minutes about this matter of answering the questions of our readers.

We have been doing all that was humanly possible to keep up with this correspondence. We propose to go on doing it and we hope and expect to be able to cope with this expanding service in time. I want to apologize here and now to the readers whose questions have not been answered. I only wish that they could see this pile of letters. I wish that they could see the mass of correspondence which comes into this office and to our laboratory every day. And, if they would consider the fact that we also have to get out a magazine, I think they would begin to sympathize with us in the feeling of desperation which sometimes overcomes us as we realize how utterly impossible it is for us to keep up with these demands upon our time. We have now enlarged our staff again in an effort to give you the service which you want. You may have noticed during the past year or more that our St. Louis letters have been signed by Stuart A. Mahaney. He has been radio editor of the St. Louis Post Dispatch, and is one of the best-known radio editors in the country. He has been my correspondent for a long time and has always written most interesting and most informative letters from his home city. Mr. Mahaney has now come east and has joined our staff

at Station 3XP. He is going to relieve me of a great deal of the detail work of editing the magazine and experimenting in the laboratory, and we are going to share the task of answering these letters. We are going to try to relieve my brother Merrill

of this job, because Merrill's most valuable work is in the assembling and trying out of new circuits and the development work of the laboratory.

So, those of you who have written to me and have had no answer, will you please accept this explanation and not judge too harshly my seeming lack of courtesy? It has not been because I did not desire to serve you, but simply that I have been overwhelmed with correspondence and it has been utterly impossible for me to keep up with it.

It may interest you to know that the actual net circulation of this magazine has more than doubled in the past three months. All indications now point to a circulation by the end of the season that will be at least three times what it was three months ago.

All of this added circulation brings with it added questions from new readers. We are going to keep on enlarging our staff just as rapidly as we can, but I think that you yourselves will appreciate it when I tell

you that we are not going to add to our staff until we know that the men who join us are capable of giving you the kind of information which is authoritative and really helpful.

This whole matter of answering technical questions has been one of the most serious problems that has confronted all radio publications.

I think that all of the other radio magazines now insist that a fee be paid for answering these questions or else that the questioner, in order to entitle him to the service, be a subscriber. We ourselves, when we first became swamped, put into effect the latter rule—that a man must be a subscriber to this magazine in order to have his question answered. We have never charged money for this service. Many readers have voluntarily enclosed a dollar bill with their questions, but I have always applied this dollar bill to a subscription to the magazine and have answered their questions for nothing. In other words, I thought that the dollar bill was sufficient

The Question of Dry Cell Tubes

MANY readers have written in asking why we do not print more hook-ups for the UV-199 tubes. These fans are so situated that the storage battery tube is totally out of the question with them and they must use tubes which have a minimum drain on the "A" battery. Consequently they must use dry cells.

These letters have multiplied so lately that I think it is best to state right here, for the benefit of others, the exact reason why we do not print hook-ups for the UV-199 tubes. *It is because this tube is, in our estimation, a total failure as a commercial proposition.* The buyer who gets a really good UV-199 tube is playing in luck.

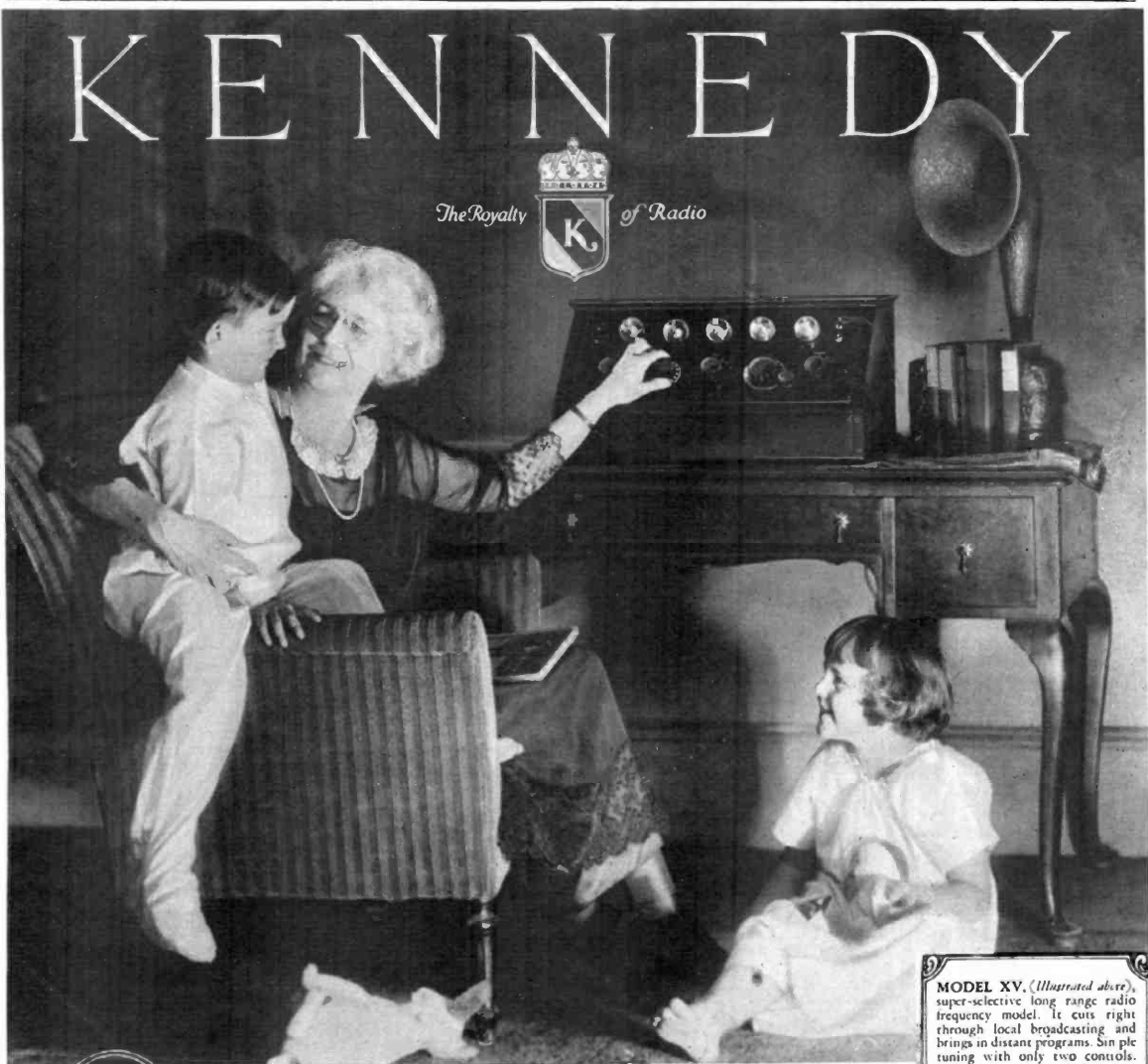
Some time ago, we put together at Station 3XP, a nine-tube superheterodyne set designed to work on these UV-199 tubes. I have forgotten the exact figures, but we were forced to buy something like twenty-four tubes before we got nine which were good enough to operate in the set. After we had used the set for one week, seven of these nine tubes died.

In order to find out just what the real condition is in regard to these tubes, we installed at the Philadelphia radio show a tube-testing outfit and advertised that we would test tubes brought to us. My brother Merrill was in charge of this outfit and had instructions to keep track of the various types of tubes so that we could know how the quality was running for each make. The result was even more surprising than I had expected it to be. *Ninety per*

(Continued on Page 61)



KENNEDY

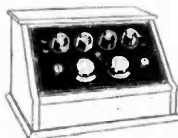


MODEL XV, (Illustrated above), super-selective long range radio frequency model. It cuts right through local broadcasting and brings in distant programs. Simple tuning with only two controls. Volume can be controlled.

Non-radiating.

Less Accessories \$142.50
West of the Rockies . . . 145.00

Opening the door to Dreamland



MODEL VI, splendid for loud-speaker reception of distant stations. Selective, but simple to tune. Anyone can use it. Each station is always found at its own setting on No. 1 dial. The other dial regulates volume. Non-radiating—no squeals to annoy others.

Licensed under U. S. Pat. 1,413,140

Less Accessories . . . \$105.00
West of the Rockies . . . 107.50

"SH-H-H! Here's the bedtime story!" As easily as she finds a favorite page in her book, Grandmother sets the tuning dial of the KENNEDY. Riotous fun stops. The familiar voice of a friend whom the children love but have never seen fills the quiet room. Popular radio entertainers are welcome members of the family circle.

Your home is filled with more of life's sunshine when you install a KENNEDY. Your family can choose from wonderful programs, and hear the feature selected reproduced with life-like brilliancy. Your KENNEDY serves in turn as a newspaper, lecturer, musical instrument, and enlivening story telling companion, all in one. Something to suit your mood can always

be found on the air—your KENNEDY brings in any desired station within a good long range, simply by turning to the dial setting for that station.

The perfection of to-day's magnificent broadcasting is matched by the perfection of KENNEDY reception. There is nothing complicated to be fussed with; although easily operated and trouble-proof, the KENNEDY includes the most advanced principles of radio engineering.

You'll appreciate the KENNEDY most when you hear it. An authorized KENNEDY dealer is located near you—we'll send his address if you write.



MODEL XI, Sheraton period mahogany cabinet with satinwood and ebony inlays. Dials and metal fittings finished in gold. Built-in loud speaker. Combines the charm of fine furniture with the most advanced principles of radio construction. Brings in out-of-town stations with loud-speaker volume. Logged tuning on one dial. Controlled volume. Non-radiating.

Licensed under U. S. Pat. 1,413,140

Less Accessories . . . \$185.00
West of the Rockies . . . 190.00

evidence of willingness to support us and that really is all that we want. Any man who is willing to do his part in supporting this magazine is certainly entitled to some consideration in his problems.

Our ruling about answering questions only from subscribers was an experimental one. I very soon became conscious of the fact that it was stirring antagonism and resentment among a very large number of our readers. They felt that it was, in a way, an attempted subscription "hold-up."

It was not intended in that way at all. We were simply doing what all of the other magazines did—going on the basis that a man who asked us for special service should be willing to pay for that service, at least to the extent of subscribing to the magazine. When, however, I saw that many readers were irritated by this, we abolished the rule. I have given a great deal of thought to this particular problem and the conclusions which I have reached are, as I expressed it to several radio dealers the other day, about as follows:

"Gentlemen," I said, "coming right down to brass tacks, you and I are making our living by persuading people to become interested in radio. These people know nothing whatever about radio; they may even not be at all desirous of having a radio set. Yet you and I, by publishing magazines, by opening attractive stores, by advertising, do all that we possibly can to persuade these people to come into our business, and so contribute to our bread and butter.

"Finally these good folks do yield to our persuasion. They buy parts and hook up a set, or they buy my magazine, or they buy a completed receiver. You and I take their money. We accept it and we buy our bread and butter with it—that is, we magazine publishers buy the bread and butter while you dealers buy automobiles—and we try to say that according to strict business principles, the bargain is ended right there. If the purchaser of the magazine or the radio set wants any further service, we argue that he should pay for it just as he pays for service in a garage for his automobile.

"I think the two things are entirely different—that is, at the present stage of the development of radio.

"Now, it is almost inevitable that the beginner in radio is going to run into some sort of trouble during the first month or so of his experience. You and I say that he is stupid. He isn't. He may appear stupid as far as radio is concerned, but if you or I tried to get into his business, we would probably seem just as stupid to him as he seems to us now. We get his questions and to us they seem silly. We say that he ought to know the answers to those questions himself if he had any brains. As a matter of

fact, he has brains and he uses them to very good purpose; otherwise he would not be able to earn the money necessary to buy a re-

ceiving set. It just happens that his brain has never been directed toward radio, and that may be a good thing for him after all.

"Now what happens in that brain of his when he runs against a snag in his radio experience? He naturally turns to us. We have persuaded him to go into radio when he did not want to do it and so he feels—and feels deeply and rightly—that you and I are morally responsible for seeing to it that he at least gets his start with whatever assistance is necessary.

"Of course I'm not talking business now; I'm talking what the high-brows call ethics. Some people claim that ethics and business do not mix. That may be true about stores—mind you, it *may* be—but I feel quite sure that it is not true of publishing a magazine. When there are no ethics involved in publishing a magazine, I will go into some other business.

"And so we, in this office, have decided to do things just a little differently. We have absolutely removed all bars to the service to which our readers feel they are entitled, and from now on we are not going to question whether a man subscribes by the year or whether he buys it each month on the newsstand, or whether he borrows it from a friend or picks it up in the waiting room of a railroad station. The fact that he has read this magazine and that our blandishments have lured him into radio, no matter to how small an extent, binds us to help him, and we have decided that we are going to do it without charge or restrictions of any kind."

That, in substance, was the sum of the conversation I refer to. I was particularly glad to see that the dealers who were with me absolutely agreed and that the only thing on which they disagreed was my statement that a store might not feel

the same responsibility. They declare that a store had just as much ethics in this matter as a magazine had. They further informed me that a vast change had come over the average radio dealer during the past six months, and that, where half a year ago all of the dealers in a neighborhood were cutting each other's throats and selling goods no matter what kind of promises were made to sell them, today they are getting together and co-operating; they are agreeing to give service of this kind to the customers, and they are placing their business upon a strictly high-grade basis.

They tell me that this is not being done from any charitable motive nor because the dealers have suddenly got religion. It is done because they have come to realize that radio offers tremendous possibilities of future developments and that they, themselves, will never realize to the full on these possibilities unless they deal with the public on a high-grade basis. That, then, is an outline of the policy which this magazine is taking on now. We are going to do all that is humanly possible to solve your troubles for you. If we fail to meet your require-

(Continued on Page 47)

Cut Out This Propaganda

I DON'T know how all of you good folk feel about it, but I am becoming heartily sick and tired of propaganda by radio. And when I say propaganda, I mean propaganda in every possible aspect of the word.

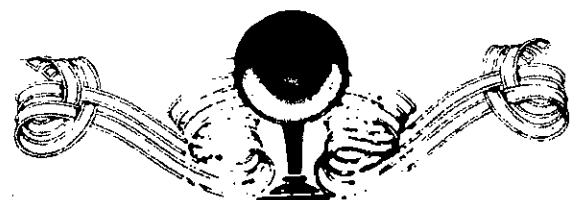
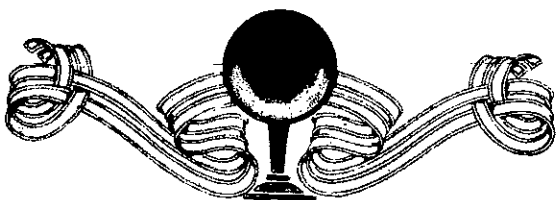
During the presidential political campaign, we all enjoyed the speeches by the genuinely big candidates. That was tremendously valuable. But I became grouchy and irritated when, day after day, in attempting to tune in some sort of real entertainment, I heard all sorts of men and women petty spellbinders trying to tell me all about politics and particularly their own and narrow view of politics when I probably knew more about it than most of them did.

Propaganda has no place in radio. I say this to include propaganda even for most worthy of objects.

It may be that I am becoming grouchy in my old age, but here is my view of the radio situation from the standpoint of the mere listener-in.

When I installed my radio set I gave a very hearty and sincere invitation to the directors of all broadcasting stations to come into my home and to take a chair by my fireside and to talk to my family and me. With that invitation there was, of course, the implied understanding that these directors would observe the ordinary social amenities and would respect the fact that my home has its own atmosphere—and that, during their visit, they would not

(Continued on Page 58)



Meet the MAGNAVOX Radiotikes



CALMLY, without vague promises, the new Magnavox Receiver has assumed a place of acknowledged leadership among the enduring radio achievements of the year.

The Magnavox one dial Station Selector means that anyone—even those who have never owned a receiving set—can command a degree of selectivity previously limited to the expert. Broadcast programs also reproduce in powerful volume and most pleasing tone. You probably have your own ideal of what a radio receiver should accomplish. Investigate the Magnavox and find that your ideal has come true.



Reliable dealers everywhere carry Magnavox Radio Products in stock. If unacquainted with the Magnavox store in your vicinity, write us for information and literature.


THE MAGNAVOX COMPANY
OAKLAND, CALIFORNIA

New York: 350 West 31st St. Chicago: 162 N. State St. San Francisco: 274 Brannan St.
Canadian Distributors: Perkins Electric Limited, Toronto, Montreal, Winnipeg

ILLUSTRATED above is the Magnavox Radio Receiver TRF-5, a 5-tube tuned radio frequency circuit encased in handsomely carved mahogany cabinet. This set, without tubes or batteries, represents remarkable value

A splendid accessory for the TRF-5 is the Magnavox M4 Reproducer (also illustrated)

Magnavox TRF-50 Radio Receiver has the same circuit and panel enclosed in carved period cabinet with built-in Reproducer,




The Magnavox Co.,
350 West 31st St., New York

Send me a complimentary copy of Radiotikes, the "funny people" of radio.

Name _____

Address _____





Unmasked!

Natural Tone Quality in Radio

FEATURES

Absolute clarity of tone

3 Tubes equal 6

Uses 3 UV-201 A4 or UV-109s

Two stages of tuned radio

Detector

Three stages of audio

Suspension Sockets, eliminating microphonic noises

Standard Approved parts throughout

Ahead of its time in features that make for simplicity and efficiency

Indoor or outdoor aerial

Pronounced selectivity

Three-dial control

Mahogany cabinet (English Brown) hand-rubbed finish

Room for A and B batteries within cabinet

You want more than mere distance—the new Grimes Type 3X-P gives you DX in abundant measure.

You want more than perfect selectivity—Type 3X-P makes you the master of your reception.

You want tone quality—the refined purity in tone color that mirrors the low and high frequency of the human voice, the ensemble of symphonies, the sonorous diapason of the organ.

All these qualities of radio reception perfected by David Grimes, the acknowledged genius of Radio, are now assured by exercising the same care in the choice of a radio receiver as in the selection of a fine piano or phonograph.

For when Type 3X-P floods the room with the

mellowness of its full-toned timbre, quality of tone is no longer a matter of doubt. It is here—here for you to listen to—here to gladden a million homes with soft voices and sweet harmonies. It adds no sputtering or tube noises to the original tone. It subtracts none of its beauties.

Type 3X-P is and brings the greatest message to the broadcast listener.

Backed by leaders in the music trade industry and by that indefatigable radio genius, David Grimes, Type 3X-P merits the confidence you have so long wanted to place in a receiver.

To the trade and to the public it is a boon—a thing of beauty—"a joy forever."

DAVID GRIMES, Inc.

1571 Broadway, New York

Strand Theatre Building

Type 3X-P

Official Laboratory
Model

RETAIL \$**85**
PRICE
without accessories



**The INVERSE
DUPLEX**
Insures Natural Tone Quality

LICENSED UNDER PATENTS ISSUED AND PENDING

Radio in the Home

GRIMES-FLEWELLING-HARKNESS

Associate Editors, Writing for No Other Magazine



Concert with Coffee or Coffee with Concert

YOU'VE noticed, of course, that when your wife sits down to listen to the radio on Friday evenings, she is careful to have a pencil and paper handy, and about 9:30 she is madly endeavoring to get down something like this:

One-half box gelatine or 3 tablespoons granulated gelatine.

Two cups strong coffee.

One-half cup cold water.

One-half cup coconut.

One-half cup sugar.
Soak gelatine 30 minutes in cold water; dissolve in boiling water, strain, and add to sugar and coffee and coconut. Turn into mold and chill. Serve with sugar and cream.

Sunday night you have a new dessert for supper, and your wife is telling her guests about the wonderful recipes that are given in the course of the concert by the Astor Coffee Orchestra from WEAF or one of its allied stations.

B. Fischer and Company engage an orchestra of nine pieces, label it "The Astor Coffee Orchestra," and rent the facilities of a five-

By GOLDA M. GOLDMAN

station radio tie-up every other Friday night for one hour, in order that a food expert may give a five-minute talk on how to use coffee or rice. This is advertising of the most subtle, most artistic and most

expensive kind. Is it worth it? Well, listen-in and we'll see:

"This is Station WEAF, New York; WGR, Buffalo; WCAE, Pittsburgh; WEEL, Boston and WCAP, Washington. B. Fischer & Company, packers of Astor Coffee and Astor Rice, broadcast their thanks to the radio audience for the many letters

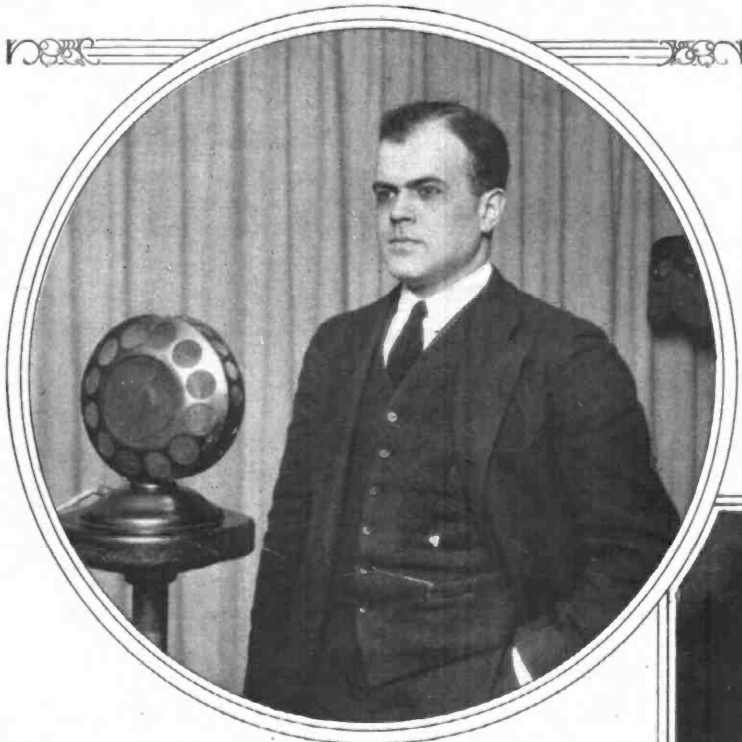
of appreciation received during the last week. The present arrangement of these delightful Friday evening programs of the Astor Coffee Orchestra will be continued. It is the pleasure of the B. Fischer & Company to serve you continually with both the 'universal beverage' with your meals and a musical entertainment of your selection after the evening meal.

"Tonight the Astor Coffee Orchestra will carry you to Spain."

This is Phillipps Carlin announcing what he considers one of the finest features on the WEAF programs. During the fifteen months or so that the orchestra has been on the air he has officiated at least three out of four times with it, so he knows what



The trio of the Astor Coffee Orchestra: 'Cellist, Abram Borodkin; violinist, Abram Coan, and pianist, Miss Anna Byrne



Left—Phillips Carlin, one of WEAF's most popular announcers, is a graduate of New York University and a Phi Beta Kappa man. During his college career he won considerable distinction as a speaker and orator. He was a member of the University's debating team, winner of its highest award and also winner of the oratorical contest. He is an excellent linguist and has a clear resonant diction which has won favor with the radio audience

Below—Elizabeth Hallam Bohn, who is a Home Economics consultant and an instructor in the Home Economics Department of the New York University. Miss Bohn broadcasts every Friday night as a part of the B. Fischer & Company program

makes it so good. "One of the most remarkable things about it," he says, "is that it can play both types of music so well—jazz and classical things. Though the personnel has changed from time to time during the last year the talent is always of the highest order.

"At first they played only jazz, with a very occasional sally into the other type, but the requests became so frequent for things of a higher order that soon they made the evening half and half. They divide each evening, giving a half-hour to the music of one country, such as Italy, the Orient, etc., and a half hour to dance music. One old lady wrote them that since they did so much of the modern dance music for the younger generation, they might play the old dances for the older folks. So they devoted one of their hours to such things as the polka and quadrille. It was so widely liked that they had to repeat it. I think that their willingness to give the listeners-in just what they want is one of the secrets of their popularity."

If you could see what is happening in the studio during this hour you would get one of the shocks of your life. The first time I heard this orchestra mentioned, a radio fan was stating that it was better than Vincent Lopez. What, then, was my amazement on peering through the leaded panes of the door which separates the outer reception room from the broadcasting station studio at WEAF to see a woman at the piano syncopating like mad while she led an entirely male organization.

This is Miss Anna Byrne, director of the Astor Coffee Orchestra and of several other orchestras which appear under her leadership at the Plaza Hotel, the Ritz, the Colony Club, and half of the private func-

tions held by New York's most exclusive social set. Music has brought into Miss Byrne's life quite as much sorrow as joy—or perhaps I shouldn't say that, since she is so happy and so tremendously successful in the work she is doing now. At any rate, her history is a living demonstration of what can be accomplished by sheer determination.

At first Miss Byrne planned to be a pianist, but just as her studies were to find culmination in a recital she was stricken with paralysis of the right hand. Then she turned to the cultivation of her soprano voice and became soloist with the Aborn Opera Company. Her unlucky star pursued her, however, and throat trouble developed.

With amazing pluck, within a year she was conducting a fashionable dancing class. Here she found her musical knowledge, and especially her sense of rhythm, of incalculable value. In adapting the music to the person whom she was teaching to dance, she suddenly found a new field of activity and so began her career as a leader of dance orchestras. B. Fischer & Co., realizing that the



(Continued on Page 34)

Flewelling's Circuit

By E. T. FLEWELLING

Associate Editor of "Radio in the Home"

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H. M. N.

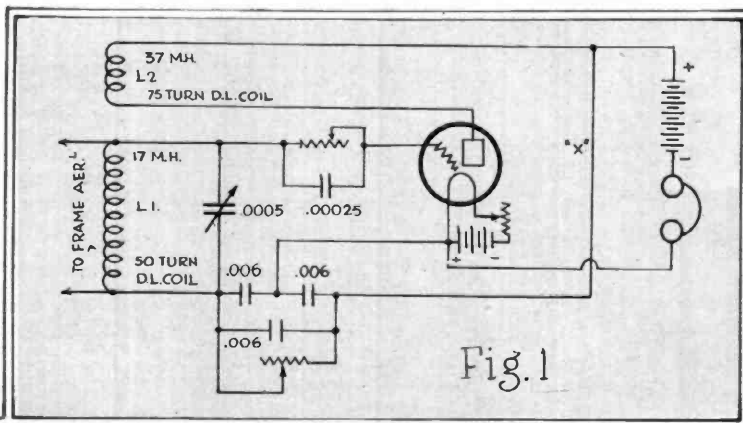


Fig. 1

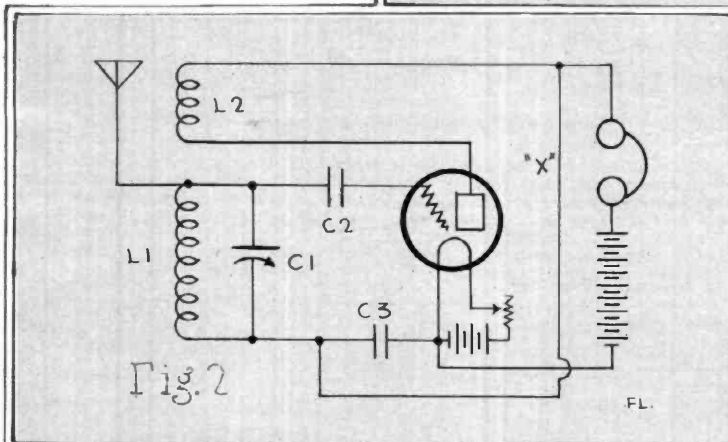


Fig. 2

other things the Flewelling receiver seems to "wear well" with folks, and I, of course, cannot feel anything but pleasure when I note that they are again publishing, in the current English magazines, "How to Build" articles on the little set. Every father likes to see his child well treated. Before going on with directions for building this receiver, I should like to have my readers read a line or two about a thing that I personally have not seen published very much. It is about the receiving ability of various types of receivers. So much has been written about the newest "Super, Last Word—Dyne" and so little about true facts that although I am familiar with Barnum's thought that the public likes to be fooled, I feel that I must now spread a bit of the gospel of truth myself. One of my reasons for joining the staff of "Radio in the Home" was, and still is, my admiration for H. M. N.'s editorials, where he gets

IN THIS time of six, eight and ten tube radio receivers it hardly seems that there is room for any consideration for a little one-tube receiver. Yet there most certainly are many folks throughout the world who are willing to see what they can accomplish with only one tube. There are still lots of us, too, who find great pleasure in the weirdness of receiving a radio message from a thousand-mile distant station with practically nothing. To carry a small receiving set around a room in one's hand while doing this gives one enough pleasure to compensate for the work in making such a receiver. The popularity of the Flewelling receiver has, undoubtedly, been greatly due to the uncanniness that it often displays in action, and this is a feature about the little thing that one seems never to tire of.

The circuit was first published in England about a year ago. It was received by the English and French public "right royally," and like all things in this world had its period of popularity. But among

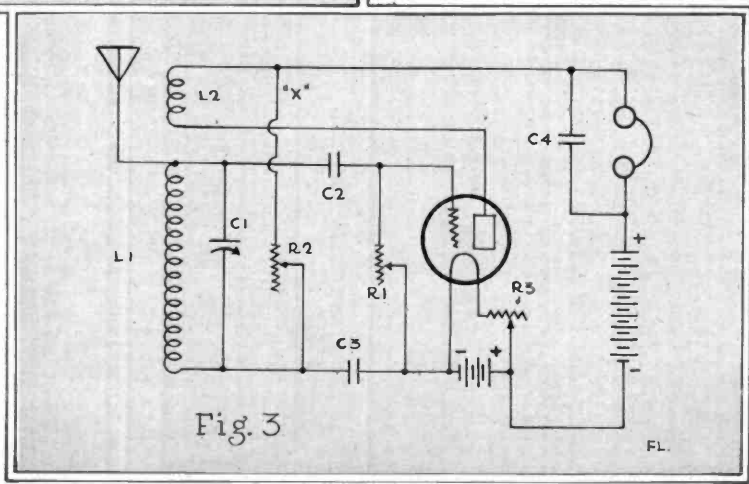
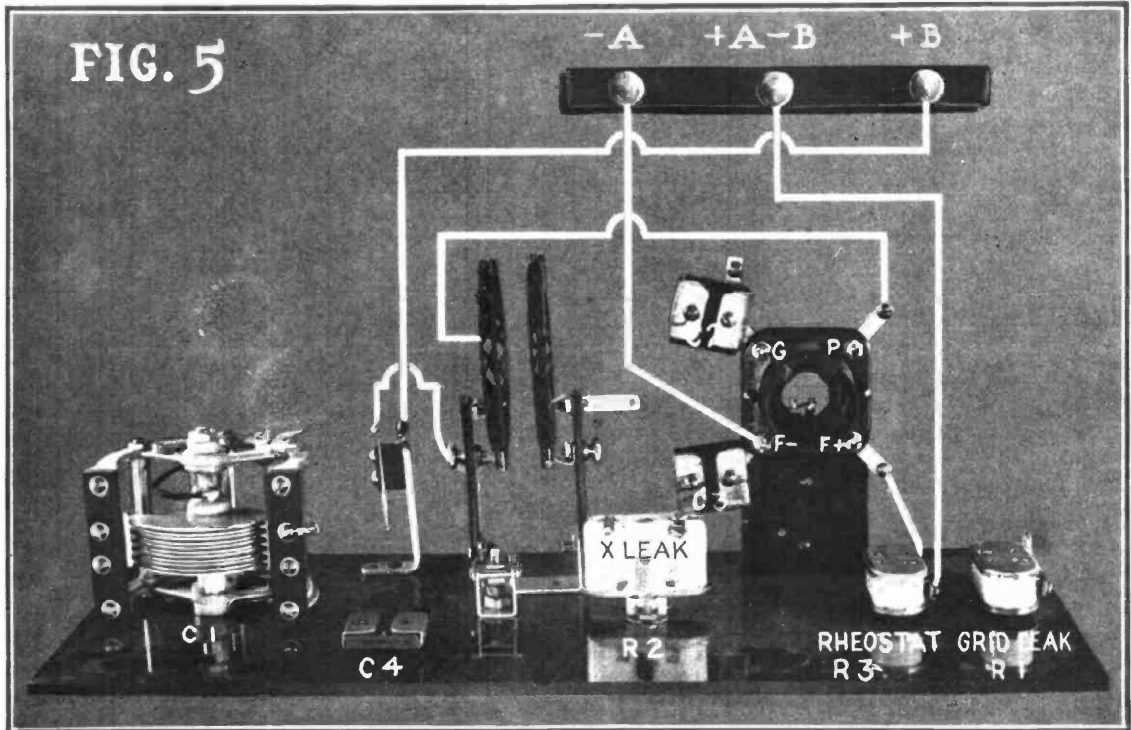


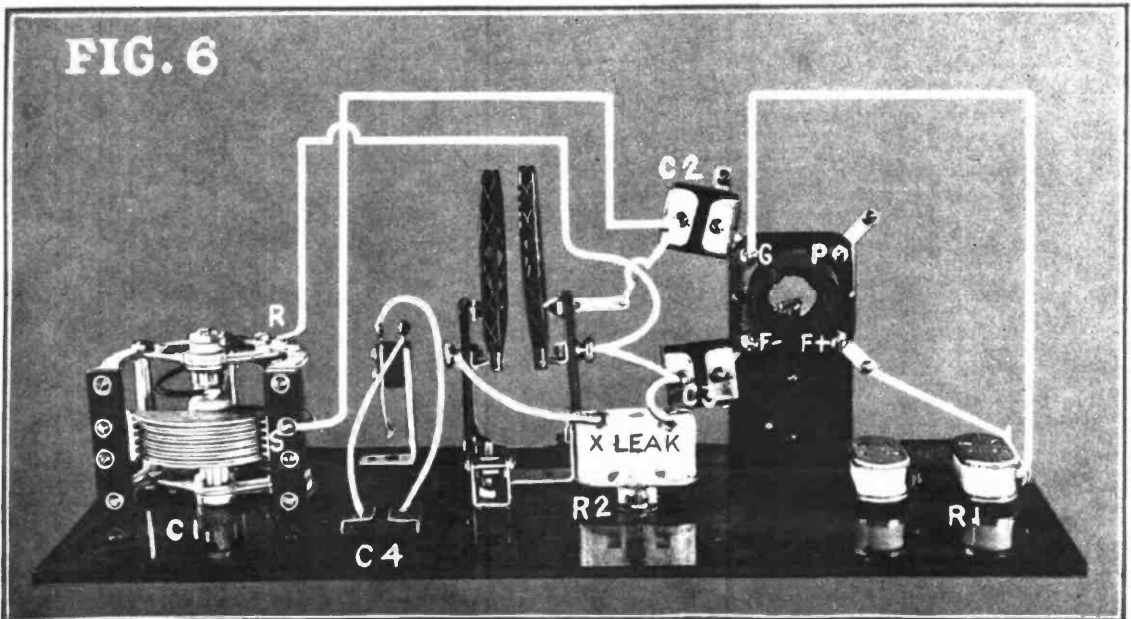
Fig. 3



right down to hard tacks and tells the blankety-blank truth as he sees it. There has been too much of the Barnum idea for the best interests of the art, and if I had the space I'd like nothing better than to devote a whole long article to nothing but real cold, hard facts about various forms

of radio receivers. Neutrodynes, reflexes, radio-frequency amplifiers and all other multitube receivers using present-day tubes reach their efficiency in direct proportion as they incorporate in the operation the use of regeneration. Regeneration reaches its ultimate in super-regeneration or "re-

generation plus." One of the best-known forms of regenerative receiver is the much heralded and trumpeted superheterodyne, six, eight or fifteen tube receivers. We are assured that one of the greatest features about these receivers is that provided the incoming signal is (Continued on Page 45)





WSAI Ready for Super Power

Left to right—E. S. Mittendorf, sports and assistant studio announcer, pictured next to the radio engineer and chief announcer, Paul A. Greene

Left to right — Chief operator, R. Evans Cooper, and Miss Frances C. Jones, musical directress and hostess, complete the quartet of aces

By E. S. MITTENDORF

Cincinnati Representative of "Radio in the Home"

IT HAS been said of Cincinnati that "its civic development has been stunted by its extreme conservatism." Many have been quick to criticize the apparent conservatism of the Queen City because it has never borne the reputation of being a get-rich-quick headquarters.

Be her reputation what it may, no one would accuse old Cincy of "radio conservatism." The old town is "radio wild." It has played an important part in the development of radio broadcasting, too. As early as 1919, Station WMH, of the Precision Equipment Company, was furnishing the forerunner of the present Radio Fans' Empire with music and other radio entertainment, and Cincinnati radio fans were quick to take up the new phenomenon. And they have been quick to follow developments since the early days.

Standing as a monument to Cincinnati's pioneer participation in the field of radio is Station WSAI, owned and operated by the United States Playing Card Company. And remaining true to the tradition of radio development in the Queen City, the operators have made every effort to keep their station abreast with the latest developments of radio transmission.

The engineering staff of WSAI do not claim to have a development station, nor that ideas tending to "revolutionize" the new industry have been born in their operating room. But they do contend that many ideas, so developed elsewhere, have found practical demonstration here. A few months after the

practicability of using storage batteries as a means of furnishing power to the transmitter was established by Station WTAM, who were the pioneers in this field, a set of batteries was installed in the power room at WSAI. The resultant improved transmission, with the noisy generator hum elim-

inated, was worth the cost of the change to the operating staff and to the company.

In order further to improve and silence the carrier wave, new types of microphones, then under development, were tested at WSAI and found to render the station's wave almost soundless. These were immediately installed as a part of the permanent operating equipment.

With the developing trend toward more power for broadcasting stations as a means of rendering reception more satisfactory, P. A. Greene, radio engineer at WSAI, decided that his station should be one of the leaders in the new field. That he was backed to the limit in his views by the directors of the United States Playing Card Company belies the oft-quoted statement regarding the extreme conservatism of Cincinnati and her business firms.

As a result of their spirit of progressiveness and confidence in radio as a permanent institution, WSAI will be the first station to install the new five-kilowatt broadcasting equipment of the Western Electric Company.

The new transmitter has a maximum output wattage of 5000 watts, and includes arrangements whereby it is possible to handle 1000, 2000, 3000 and 4000 watts respectively. Change of wattage is made by the operator by throwing a single switch.

Power to the transmitter will be furnished by rectified current transformed from 220 volts to 10,000 volts, and three motor generator sets. In keeping with the general consensus of opinion,



Miss Helen Jean Upperman, voted one of the most popular features at WSAI

as expressed at the Third Hoover Radio Conference, the new transmitter will be located at an approximate airline distance of twenty-nine miles from the center of population in Cincinnati. The exact site will be at a point one or two miles south of Mason, Ohio.

Plans for a building to house the new set have been completed and work on the new plant began

solo studio, twenty by twenty feet, is used for solo work and speeches.

An idea of the additional space necessary to take care of the new transmitter may be gained when the space required for

transmitter is a one-story brick and will contain the transmitter room, a radio control room, store and work room, office, heating plant, power room, ventilating room, laboratories and operators' quarters.

Two new two hundred foot towers of self-supporting steel of the latest design will replace the one hundred and fifty-seven foot towers used with the present station.

The grounding system covers approximately one hundred and sixty thousand square feet. Hundreds of pounds of copper wire are used in the system, which resembles the backbone of a fish. A main buss of heavy copper wire connecting the two towers represents the backbone, from which smaller wires branch two hundred feet on either side every two feet, the entire four hundred feet the distance between towers. With the new transmitter, WSAI hopes not only to add greater distance to the fair DX record which it has now, but also to improve WSAI reception generally throughout this country. According to P. A.

WSAI solo studio, used for speeches and solo work

Below — The studios and operating plant on the third floor of one of the company's buildings. This view shows the 200-foot antenna towers, under which the plant is located



some time ago. It is planned to have the new equipment in operation by January 1, 1925. In deciding on the new site for the transmitter, the operating staff took into consideration the large number of Queen City radio fans, who, were the set not placed at some distance from their scene of operations, would be unable to get through WSAI to out-of-town stations without great expense incurred in the purchase of sets of fine selectivity.

The present studios, beautifully and lavishly furnished, which have been ranked with the leading broadcasting stations of the country in point of beauty, spaciousness and efficiency arrangement, will be used with the new transmitter. Artists will appear in their present familiar surroundings, and the output of the microphone will be shipped over special telephone wires to the transmitter. An automatic control, located in the studios, will permit the studio director to control the transmitter located approximately thirty miles away. A special telephone wire will be used for communication with the operating staff at the transmitting plant.

The studio layout consists of a reception room, forty-two by twenty feet, which is equipped to take care of the large number of visitors who come to the studios during the broadcasting periods. Leading off from the reception room, on either side, are two studios; the larger (concert) studio is the same size as the reception room, and is used for orchestral and concert work, while the



new operating plant is compared with the operating room space of the former station. The five hundred watt equipment occupied a floor space of approximately 420 square feet, whereas the new plant will occupy 2400 square feet.

The building which houses the new

Greene, radio engineer and station director, the use of more power should render station signals capable of being amplified to such a point that interference from static should be practically negligible. Present distance records, held by the station, which include verified reception in Leicestershire,

England; Glasgow, Scotland; several reports from Hawaii, Greenland, Alaska and Central America, will undoubtedly be considerably bettered under conditions of more power.

The same staff with which radio fans are familiar will operate the new station. Paul A. ("Texas") Greene will continue in the role of station director and chief announcer. Mr. Greene is a native of the Lone Star State, and is recognized as one of the foremost radio engineers in the United States. The "Chief" left his native sagebrush and jackrabbit trails at the tender age of 18 years to embark upon a career of flying with Uncle Sam's Naval Air Force, and was discharged at the close of the war with high honors and rank.

His work in radio in this branch of the service naturally led him into the new field, and as a radio engineer of the Western Electric Company he was responsible for the installation of eight of the country's principal broadcasting stations. W F A A, at

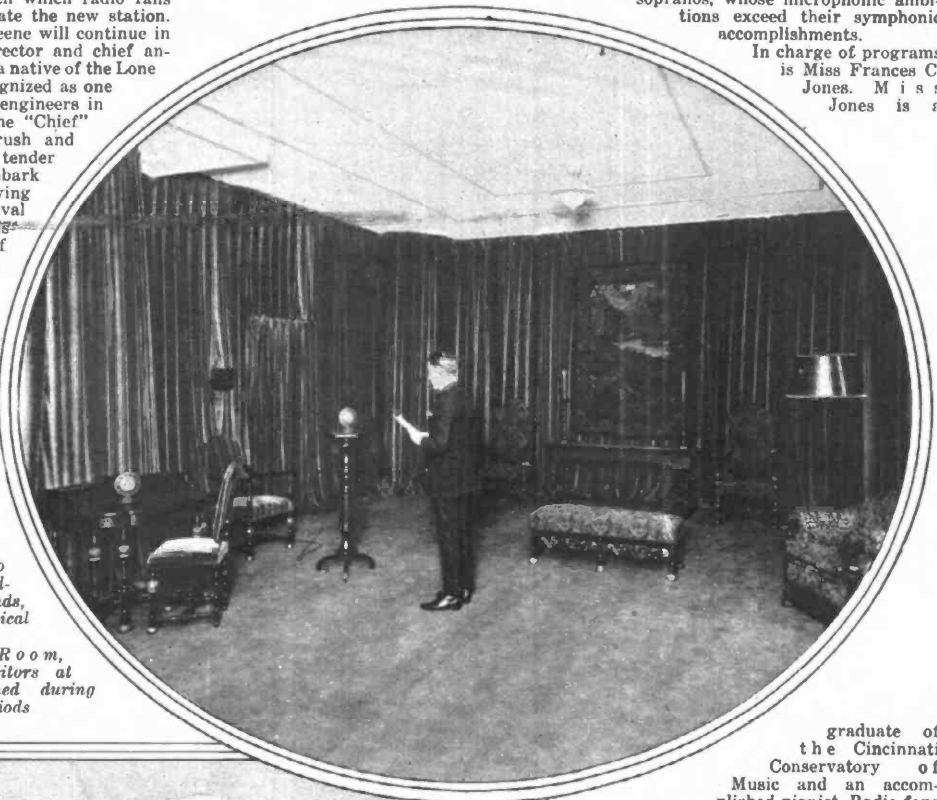
The concert studio from which are broadcast orchestras, bands, choirs and large musical organizations

Below — Reception Room, where the many visitors at WSAI are entertained during broadcasting periods

his station with the leaders in point of transmission qualities. As WSAI's chief announcer he has made a host of friends among the radio fans, who find his soft, baritone voice especially pleasing to the ear.

the staff who realize that, should the "Big Gun's" ambition be gratified, he would quickly become acquainted with that species of unpopularity well-known to baritones, and for that matter, tenors, contraltos and sopranos, whose microphonic ambitions exceed their symphonic accomplishments.

In charge of programs is Miss Frances C. Jones. Miss Jones is a



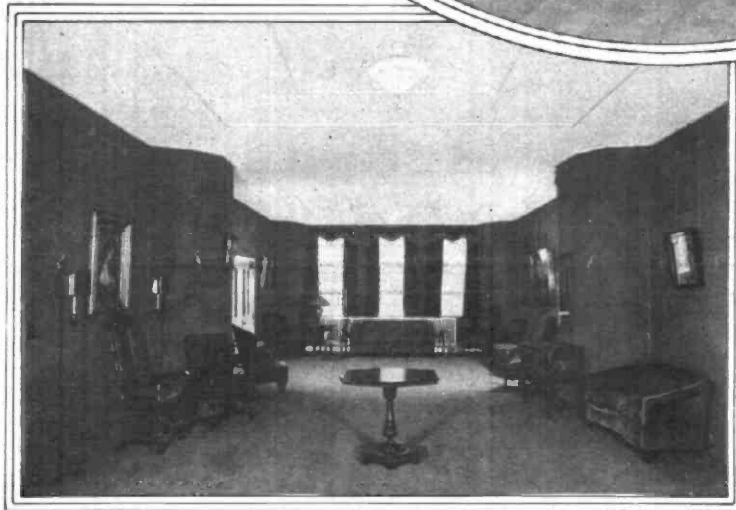
graduate of the Cincinnati Conservatory of Music and an accomplished pianist. Radio fans do not listen for call letters after hearing the familiar announcement, "Miss Jones at the piano," because the two are synonymous. Cincinnati artists are always glad to reward her winning personality by putting forth their best efforts in the WSAI studios.

"Bob" Cooper, chief operator, is an old-timer in the radio game. He was one of the operators and announcers at original station WHM, of the Precision Equipment Company back in 1919. He is familiar with the dah-di-dah tribe, too, having served two years as operator on the ships of the United States Shipping Board.

E. S. Mittendorf, assistant announcer and sports announcer completes the staff roll of WSAI.

It would not be fair to readers of *Radio in the Home* not to introduce to them the regular entertainers with whose work they are, in a fair measure, already acquainted.

On Tuesday nights, from 7 until 7:30 and again from 8 until 9, thousands of the country's fans regularly tune to Robert M. Visconti's Hotel Gibson orchestra. This organization entertains with the higher class of music and has developed a wide following among lovers of this type of music. The genial director, Mr. Visconti, is always ready to comply with fan requests, and, on several occasions, has presented numbers which "they hadn't heard for twenty years." He has been absent



Dallas; WBAP, Ft. Worth; WOC, Davenport; WOR, Newark; WMC, Memphis; KOP, Detroit; WLW and WSAI, Cincinnati, all stand as monuments to his activities in this field.

Since his connection with the United State Playing Card Company, he has placed

The "Chief" does everything he attempts well, but his one ambition is likely to prove his ruin. His determined efforts to use his baritone voice with musical intent before the WSAI microphone have been successfully withstood up to the present by the combined stand of the other members of



The Chime Tower, showing the WSAI chimes of twelve radio bells. Chime concerts are a regular feature of WSAI programs

Below—The largest of the WSAI radio chimes. The bell weighs two and one-half tons and contains the names of officers and directors of the company

from his orchestra on only one broadcasting night in a year and one-half, and on that occasion pleaded extreme nervousness as an excuse for his desertion. Inquiry by WSAI's announcer as to the reason for his condition elicited the information that Mr. Visconti had spent the previous day picnicking with members of his organization and had determined upon an airplane ride as a fitting finale therefor. That the aerial experience did not act as the expected tonic was attested by his nonappearance on the following night.

A newly inaugurated feature of WSAI programs are those given in conjunction with the Cincinnati Enquirer. The pro-

grams are arranged through the radio and dramatic departments of the Enquirer and are presented on alternate Thursdays.

WSAI is fortunate in being located in a city of musical note. Two of the country's leading schools of music, the Cincinnati Conservatory of Music and the Cincinnati College of Music, furnish music for regular programs during the winter months. Many former students of these institutions, who have appeared before the WSAI microphone in the past, have gained national prominence in their profession since.

Saturday night frolics would not be complete without Freda Sanker's Toad Stool Orchestra. Miss Sanker has assembled a wonderful aggregation of dance musicians who have the distinction of having been termed "the best on the air," by Ed. Gallagher, of Mr. Gallagher and Mr. Shean fame.

A regular feature of the winter months includes lectures by prominent professors of the University of Cincinnati, and particularly by nationally known surgeons connected with the University's Medical College. These talks proved so popular as an education feature last year that other features of a like nature are being included in this winter's programs. The lecture series was inaugurated on November 11, by Arthur R. Morgan, President of the Board of Trustees of the University, and will continue until June. No review of the outstanding program features of WSAI would be complete without prominent mention of the weekly news review, presented on Saturday nights at 9 o'clock, by Allison F. Stanley. These reviews contain a digest of the main topics of the week's news and have proved a favorite with station fans.

WSAI boasts the only set of "radio bells" in the world. The chime, numbering twelve bells, was designed and built especially for broadcasting purposes, and is located in a specially constructed tower in the center of the United States Playing Card Company grounds. The bells have an approximate total weight of 22,000 pounds, the largest weighing two and one-half tons and the smallest 300 pounds. Fifteen minute chime (Continued on Page 48)



The Counterflex Simplified

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By **KENNETH HARKNESS**

Associate Editor of "Radio in the Home"

friends with the opera "Rigoletto," broadcast from WEAF. In all, I tabulated twenty-two stations in two hours, some of which I had never heard before.

"To say that I am pleased is putting it mildly. I think it is the greatest Harkness knockout yet and not only that, it does away with crystal troubles and consequent broad tuning. . . . All hail the Counterflex!"

on the first stage of the Counterflex with more than sufficient volume on the loud speaker, and to do this with KNX on the air. I am approximately one-half mile from KNX, on 337 meters, and about 500 miles from KGO, on 327 meters. Personally, I consider this pretty decent reception, especially as I am using C-299 tubes and dry batteries instead of storage batteries.

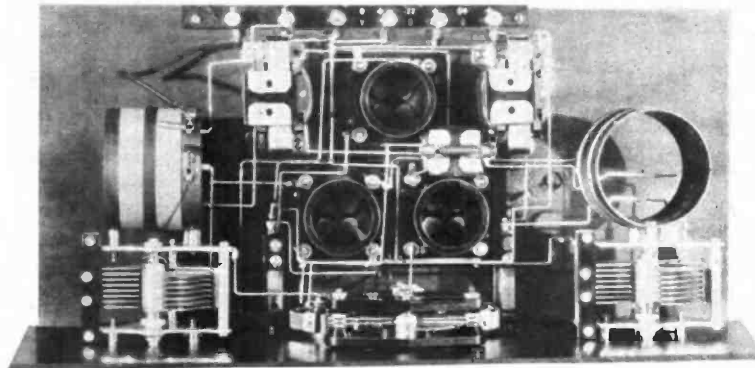
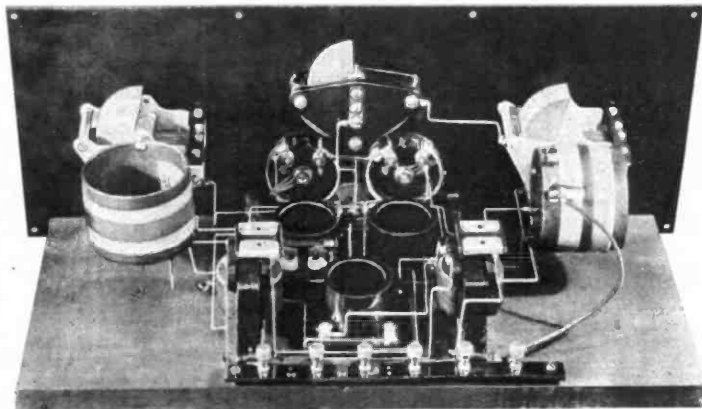
"This afternoon at 5:45 P. M., Pacific Time, I was listening to KDKA, at East Pittsburgh, on 316 meters, when KNX came on the air here and blotted them out. I

THE Counterflex seems to have made a hit! H. M. N. tells me that the October issue of *Radio in the Home*, which contained the first disclosure of this circuit, is almost out of print, so great has been the demand for copies.

I am glad to know that you like this circuit so well. I thought you would. I experimented for a long while before I introduced it and made a great many comparative tests with other types of receivers. It seemed like a winner to me. In the October issue I mentioned the fact that the three-tube Counterflex is practically as efficient in its operation as a well-known make of a five-tube set. A great many of those who have built the Counterflex have written telling me that they have also found this to be true.

I am going to take the liberty of quoting from two of the letters I received. The experience of these readers with the Counterflex circuit will undoubtedly be of interest to you. The first letter is from Robert Lindsay Mason, of Knoxville, Tennessee. Mr. Mason says:

"I had already built the Harkness Reflex, and when the Counterflex made its appearance I realized at once that it was to be a record-breaker, for its embodied all



These two views, and the one on Page 20, show the amateur the best layout of both baseboard and panel as presented in the commercial model of the simplified Counterflex

have written to KDKA tonight, giving the name of the soloist, the accompanist and the time I heard them, asking them to verify it. How is that for DX stuff?"

I should say that it is extremely good! Twenty-five hundred miles in the daytime! Please note that it was only 5:45 in the afternoon when Mr. Davis heard KDKA. At Pittsburgh, it was only 8:45 P. M.

The selectivity of the Counterflex which Mr. Davis built is also very excellent. This report will probably interest a good many of those who have written to me saying that the only thing they didn't like about the Counterflex was its lack of selectivity. If your Counterflex is not selective there is something wrong with it.

Since I first wrote about the Counterflex circuit in the October issue I have revised and slightly simplified this system and in these pages I am showing photographs of a receiver using this new, simplified circuit, together with step-by-step wiring diagrams.

You will remember, perhaps that the three-tube Counterflex receiver which I described in the October number had only one rheostat to control the filaments of all three tubes and had, besides, a double-pole, double-throw switch for reversing the primary connections of the second radio frequency transformer. The object of this switch was to prevent the receiver from

the necessary features which the Harkness Reflex lacked, one of which was a little more sensitive tuning, and the other—and the most important—the elimination of the capacitive feed back between the grid and plate circuits which produced uncontrolled regeneration. So I built up the Counterflex. Last night I coupled her in. I had the sixty foot aerial and all. I switched on the phones. Well, believe me, I saw she was a winner at once, so plugged in the loud speaker. From that time on I never heard such volume and such excellence of tuning. I sat up with the set until the wee hours, besides entertaining a party of

Mr. Mason's enthusiasm is encouraging. His opinion is particularly valuable because he had already built and operated the Harkness Reflex receiver and was able to make a comparative test.

The second letter is from James R. Davis, of Los Angeles, California. Mr. Davis records most astonishing long distance reception with the Counterflex. He also finds the set extremely selective and particularly appreciates this feature because there are five powerful broadcasting stations within a radius of four miles of where he lives. In his letter he says:

"I am able to bring in KGO, Oakland,

squealing when the strong carrying waves of nearby broadcasting stations set up forced oscillation which could not be controlled by the Counterdon.

The new, simplified three-tube Counterflex circuit is shown here. The double-pole double-throw switch is omitted entirely and an additional rheostat is used to control the filament current of the rectifying tube. These are the only changes, but they are distinctly advantageous and considerably simplify the wiring. The addition of the detector rheostat does two things: it provides an individual control of the rectifying action, thereby improving the quality of reception, and it obviates the necessity for the special switch, as "squealing" from local broadcasting can be controlled by this rheostat.

The added detector rheostat also acts as a convenient volume control. With the set operating at full efficiency on three tubes local stations are sometimes unpleasantly loud—too loud for good quality. With only two tubes the volume may be insufficient. Using all three tubes, however, the volume can be controlled by varying the detector rheostat; it can be made just as loud or as soft as may be necessary.

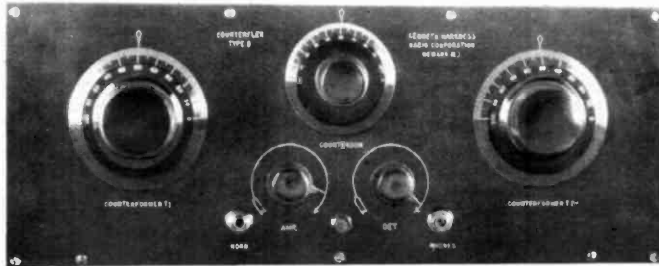
The general functioning of the Counterflex circuit has already been explained, particularly in the October and November issues, and will not be repeated here.

The receiver illustrated in the photographs accompanying this article uses the circuit on page 20 and you will not find this set difficult to build. You will need the following parts:

- 1 Front Panel, measuring 7"x18".
- 1 Wooden baseboard, measuring 6 $\frac{3}{4}$ "x17".
- 1 Harkness Counterformer, Type T1.
- 1 Harkness Counterformer, Type T2.
- 1 Counterdon Vernier Condenser.
- 3 Tube Sockets.
- 2 Filament Rheostats (20 ohms each).
- 1 Filament switch.
- 2 Harkness Audio transformers.
- 1 Single Circuit Fil. Control Jack.
- 1 3-prong Closed Circuit Jack.
- 1 Grid Condenser, .00025 mfd.
- 1 Grid Leak, 1 megohm.
- 1 Fixed Condenser, .00025 mfd.
- 1 Fixed Condenser, .0001 mfd.
- 2 4" (or 3 $\frac{3}{4}$ ") dials.
- 1 3" Dial.
- 1 Strip of panel material meas-

uring 6"x $\frac{1}{2}$ ", for mounting binding posts. 6 Binding Posts.

Bus-bar and Spaghetti. The "Counterformers" specified in the above list of parts are visible in the photographs. Each Counterformer consists of a special type of air-core radio-frequency transformer mounted on a low-loss die-cast variable condenser with a maximum capacity of .00026 mfd. In last month's issue



I gave the constants of the radio-frequency transformers for this circuit, but once again I remind you that these constants are only accurate when used with a variable condenser of the same capacity as the Harkness 15-plate.

The "Counterdon" is a special 3-plate variable condenser made for the Counterflex circuit. It can be seen in the center of the panel in the rear views of the set.

In the above list of parts I specified Harkness audio-frequency transformers. If you have other makes of transformers on hand, use them. You may have to experiment a little with the set to balance up the values. I merely specified Harkness transformers because I give the values of the fixed condensers to use with these parts. With other makes of transformers it may

Schematic diagram for the simplified Counterflex

be necessary to use a different value of fixed condenser across the secondary of the reflex transformer.

The general lay-out of the apparatus is clearly shown in the photographs. If you don't like this lay-out follow your own fancy. It won't make any difference to the operation, so long as you don't make your grid and plate leads too long.

In wiring, follow the circuit on page 20, or, if you are unaccustomed to this type of diagram, follow the step-by-step diagrams given in the succeeding pages. Be especially careful to wire the connections to the Counterformers correctly. If you wind your own coils, remember that the beginning of the primary of T1 goes to the antenna and the beginning of the secondary of the secondary to the grid of the reflex tube. Similarly, the beginning of the primary of T2 goes to the plate and the beginning of the secondary to the grid of the detector tube. If you reverse these connections, particularly those of T2, the efficiency of the set will be greatly lowered.

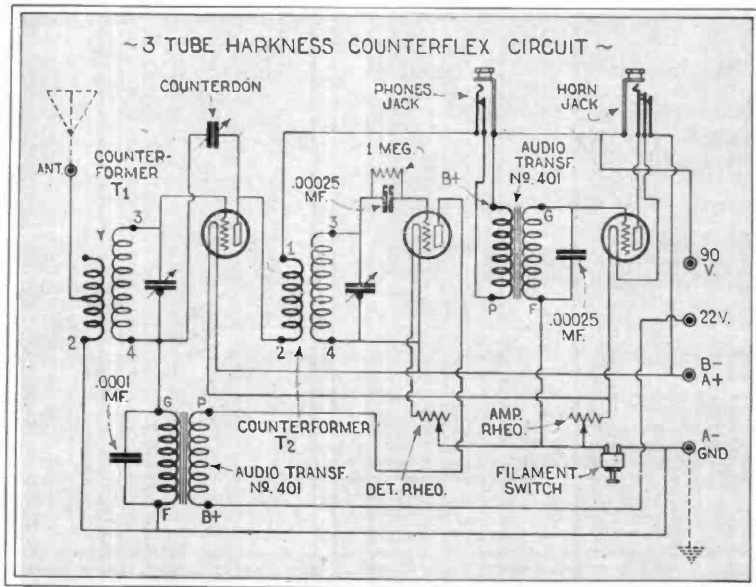
Also be careful to connect the audio-frequency transformers correctly. A reversed connection will lower the audibility.

You will notice that the primary of coil T1 is tapped. When the aerial is connected to one clip, ten turns are included in the circuit; when it is connected to the other clip, fifteen turns are included. This arrangement is provided so that long and short aerials can be used with the set. The whole fifteen turns should be used only with aerials less than fifty feet long. With longer aerials, ten turns are sufficient.

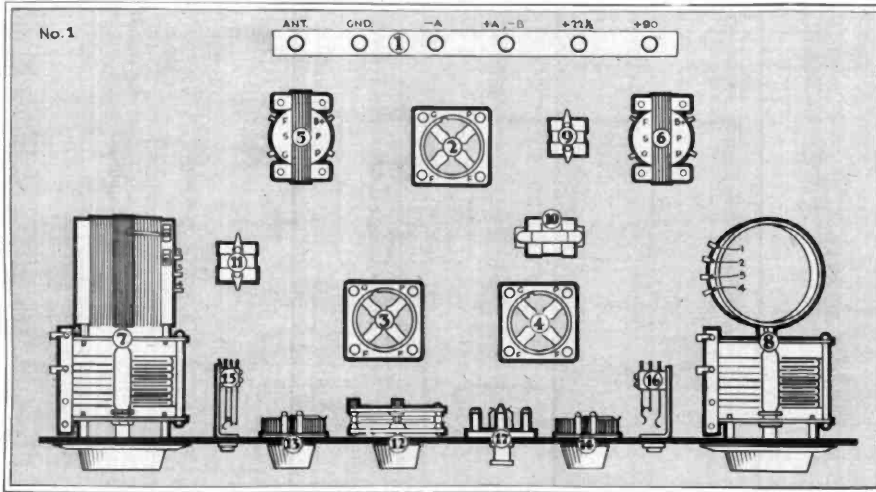
The usual accessories are required with this receiver—a filament battery, plate battery (90 volts), telephones, loud speaker and three tubes. For best results, use type

C-301A or UV-201A tubes. A C-300 or UV-200 can be used as rectifier if you prefer it. They are rather difficult to get at the present time and they consume a great deal more current, but they are undoubtedly very good rectifiers. If you use a soft tube, your detector rheostat should only be 6 ohms, instead of 20 ohms as specified. Personally I use "A" tubes throughout with only 22 volts on the plate of the detector tube. I find, with most tubes, the rectification is better with the low plate voltage.

In the October number I sug-



(Continued on Page 48)



IN THE preceding pages I have described and shown photographs of a new, improved type of three-tube Counterflex receiver. In the accompanying diagrams each step in the wiring of this receiver is clearly illustrated.

In diagram No. 1 all the parts used in the construction of this receiver are shown and the layout of the apparatus is roughly illustrated. The complete list and description of the parts needed to build this receiver can be found in the preceding article. The actual arrangement of the parts on the front panel is also shown in the photo-

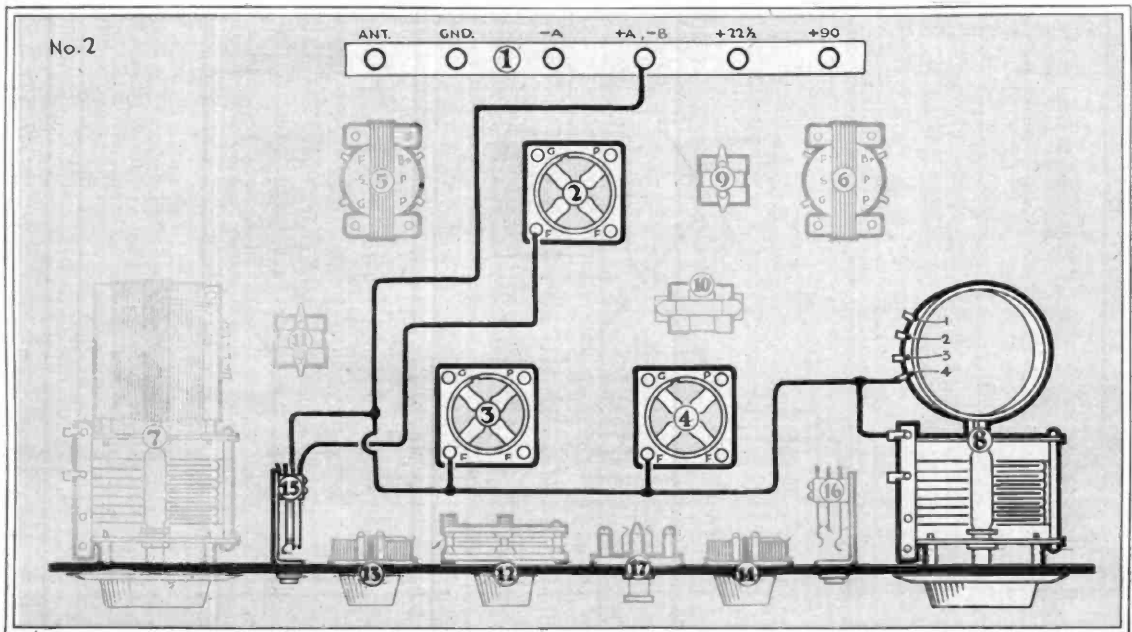
3XP-Style Wire-ups of the Simplified Counterflex

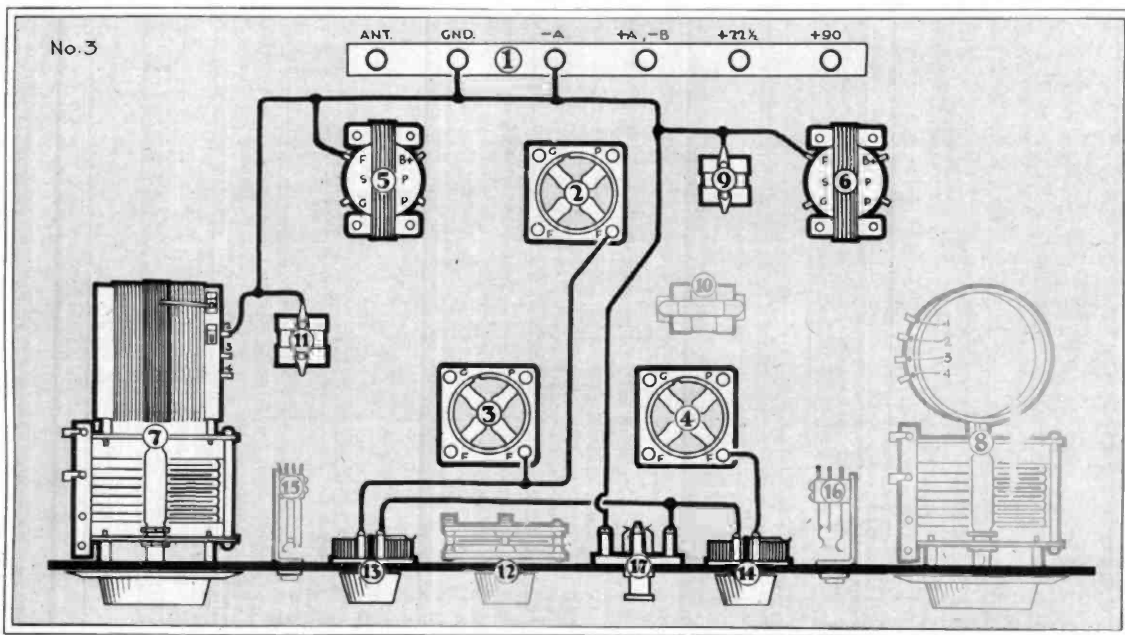
By KENNETH HARKNESS

graphs. In the first diagram, part No. 1 is a strip of celeron or hard rubber with six binding posts mounted on it and soldering lugs underneath. Nos. 2, 3 and 4 are standard tube sockets. Nos. 5 and 6 are audio-frequency transformers. No. 7 is the counterformer type T1 and No. 8 the counterformer type T2. No. 9 is a .0025

fixed condenser. No. 10 a .00025 mfd. grid condenser and 1 megohm grid leak. No. 11 a .0001 mfd. fixed condenser. No. 12 is the counter-don vernier condenser. Nos. 13 and 14 are 20-ohm rheostats. No. 15 is a single-circuit filament-control jack and No. 16 a closed-circuit three-prong jack. No. 17 is a battery switch.

Diagrams Nos. 2 to 6 illustrate the actual connections to be made between these various parts, each diagram representing the progressive stages in the wiring until it is completed. The wiring should be per-





formed in accordance with the instructions given below. In these instructions, reference is made to the numbers of terminals on the counterformers. These numbers appear on the labels inside the coils.

Diagram No. 2

Wire No. 1: From positive filament binding post on strip No. 1 to second prong of jack No. 15, then to positive filament terminals of tube sockets Nos. 3 and 4, then to rotor of condenser of counterformer No. 8.

Wire No. 2: From terminal No. 4 of counterformer No. 8 to wire No. 1.

Wire No. 3: From first prong of jack No. 15 to positive filament terminal of tube socket No. 2.

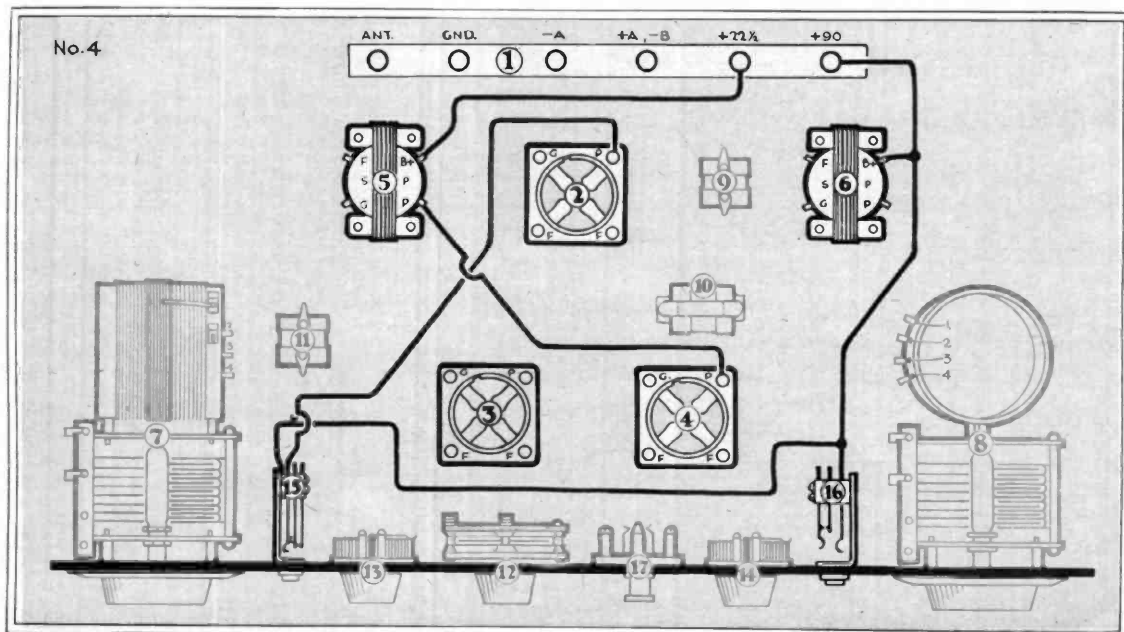
Diagram No. 3

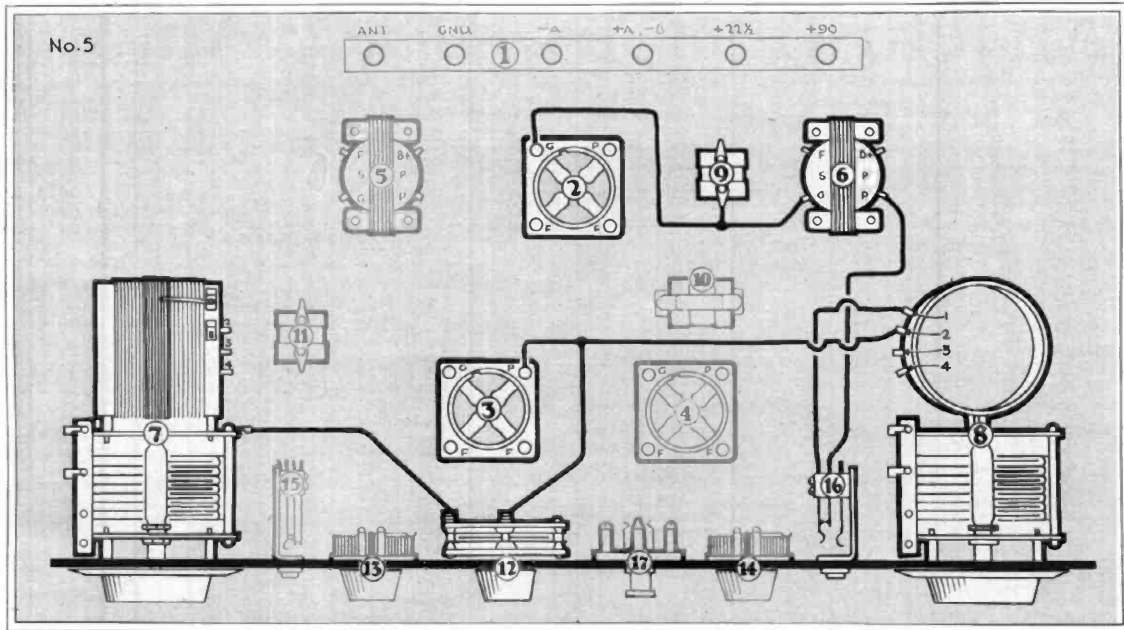
Wire No. 4: From terminal No. 2 of counterformer No. 7 to one side of condenser No. 11, then to terminal "F" of transformer No. 5, then to "ground" binding post on strip No. 1.

Wire No. 5: From ground binding post on strip No. 1 to negative filament binding post on the same strip, then to one side of battery switch No. 17.

Wire No. 6: From terminal F of transformers No. 6 to one side of condenser No. 9, then to negative filament binding post on strip No. 1.

Wire No. 7: From left-hand terminal of rheostat No. 13 to negative filament





terminals of tube sockets Nos. 3 and 2.

Wire No. 8: From right-hand terminal of rheostat No. 14 to negative filament terminal of tube socket No. 4.

Wire No. 9: From right-hand terminal of rheostat No. 13 to left-hand terminal of rheostat No. 14.

Wire No. 10: From right-hand terminal of battery switch No. 17 to Wire No. 9.

Diagram No. 4

Wire No. 11: From 90-volt terminal of

strip No. 1 to third prong of jack No. 16, then to fourth prong of jack No. 15.

Wire 12: From terminal "B plus" of transformer No. 6 to wire No. 11.

Wire No. 13: From third prong of jack No. 15 to plate terminal of tube socket No. 2.

Wire No. 14: From 22½-volt terminal of strip No. 1 to "B plus" terminal of transformer No. 5.

Wire No. 15: From terminal "P" of

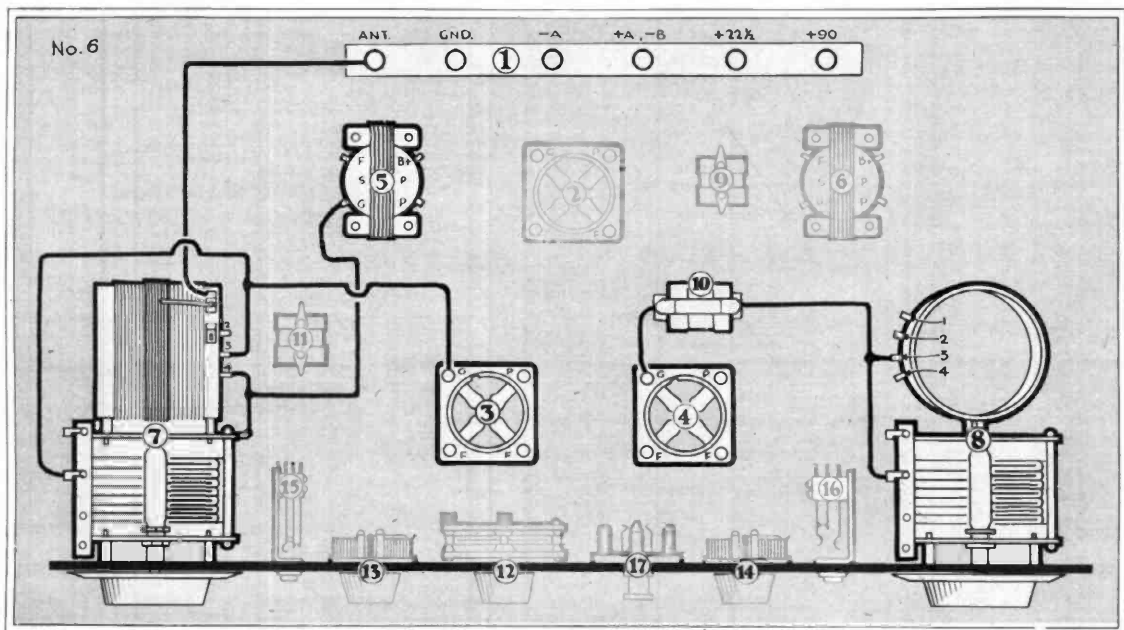
transformer No. 5 to plate terminal of tube socket No. 4.

Diagram No. 5

Wire No. 16: From grid terminal of tube socket No. 2 to one side of condenser No. 9, then to terminal "G" of transformer No. 6.

Wire No. 17: From terminal "P" of transformer No. 6 to center prong of jack No. 16.

Wire No. 18: From (Continued on Page 50)



Angelus Temple is Unique Among Broadcasters

By DR. RALPH L. POWER

Los Angeles Correspondent of "Radio in the Home"



Aimee Semple McPherson, pastor-evangelist of the Angelus Temple, Los Angeles (KFSG)



peaks, the whirling sands of the desert, the sluggishly flowing river houseboat, the tramp steamer on the high seas—everywhere, in fact, that the Word of God can go.

Aimee Semple McPherson, evangelist extraordinary, knows human psychology. Or, more properly speaking perhaps, she knows the practical application of everyday psychology. Of course, her programs include masterful benedictions, messages of cheer and inspiration, powerful and penetrating sermons, testimonials delivered with a punch and vigor, and healing services of faith and power.

But the thing that stamps Angelus Temple as different in radio annals is the uniqueness and beauty of the musical programs. For instance, Sister McPherson booked the Jubilee Singers for a brief season, and the colored minstrels of the Old South have proved to be among the most popular of local entertainers. When they broadcast their haunting melodies of cotton field tunes, of old-time spiritual chants, they blend their way melodiously into the homes of radioland and bring joy and gladness to many a weary and tired soul. Transposed from their homeland, their own music brings back to them vivid recollections of happy days spent at the family hearth, and their heart and soul go into the music that is wafted skyward.

But the McPherson brand of the Gospel isn't content to be issued from the pulpit and via radio in the cut-and-dried fashion. Her congregation stretches out into more than a dozen neighboring towns where student-evangelists are holding services in tents or temporary structures.

At one time Mrs. McPherson preached to eight cities simultaneously. A loud speaker was installed with each congregation. When a hymn number was called in

THIS, friends, is the story of a radio station with a soul. When KFSG first went on the air, thousands of fans registered emphatic and vigorous protest because some nonselective sets would not enable them to tune out the new station. But that's all ancient history now. Most of

the people wouldn't tune KFSG out now if they could.

This is a personal narrative of a church that not only brings the people to it by the thousands, but it also goes to the people by the hundreds of thousands in their homes, the rugged fastnesses of the mountain

The Angelus Temple, Los Angeles. Radio Station KFSG

the Temple, the congregations in the various towns opened their hymnals to the same number; when the congregation in Los Angeles stood to its feet, the radio congregation rose also; when one sang, the others sang; the Lord's prayer, they all repeated it; when one was told to lift its hands, all lifted their hands; when one congregation was asked to wave their handkerchiefs, they all waved together; all listened to the same sermon. Surely radio has a multitude of uses. The day of miracles is not over, and such an unprecedented opportunity for preaching has never been known. The Temple also receives church members by radio. In Angelus Temple the congregation hears the pastor saying, "Do you pledge to live clean Christian lives for God?" Immediately comes the overwhelming response, "We do." The congregations in the outlying districts hear the queries from the Temple through the receiving sets and immediately their answer is dispatched back to the Temple via private telephone lines, amplified in the radio room and broadcast through the loud speaker.

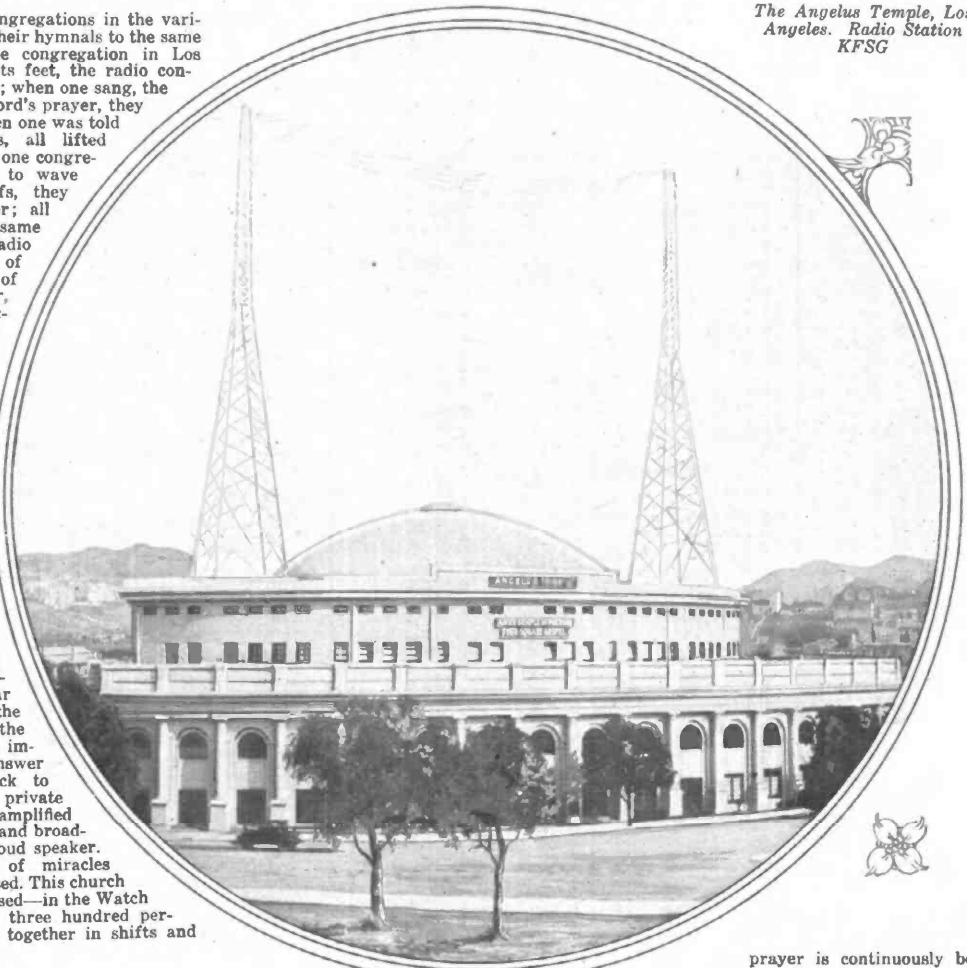
No, the day of miracles surely has not passed. This church edifice is never closed—in the Watch Tower more than three hundred persons have banded together in shifts and

prayer is continuously being said.

How did Southern California become the home of this movement? In a lifetime of evangelistic service, Sister McPherson gathered her savings, and, together with free love offerings, the building came into being. Gigantic in size and beautiful in appointments, there are seats within the main auditorium for 5300 people, while there is a "500" room for that number of persons, a "100" room for that number, as well as smaller rooms, offices, reception rooms and the like. The stately dome of the Temple rises over the skyline of Echo Park and is now well established as a landmark of Los Angeles since its erection some three years ago.

On the roof the imposing antenna towers are plainly visible, while the glass-enclosed operating room for the radio is nestled snugly on the top floor. The Gray Studio, splendidly appointed, is used for afternoon programs of musical numbers furnished by individual artists and including readings, sermonettes, vocal and instrumental selections. From the main auditorium in the mornings (Continued on Page 44)

The Gray Studio, KFSG, Angelus Temple, Los Angeles



The Beginner's Best Bet

THIS hook-up article is intended for the absolute beginner in radio, but I want to say right at the start that the experienced fan who likes to try out all kinds of new tuning instruments will find something of great value to him in it also.

First, this will be an introduction to about the only three-circuit tuner to which I can give my unqualified approval—because it can be adjusted not to radiate. It will also bring to the attention of the ex-

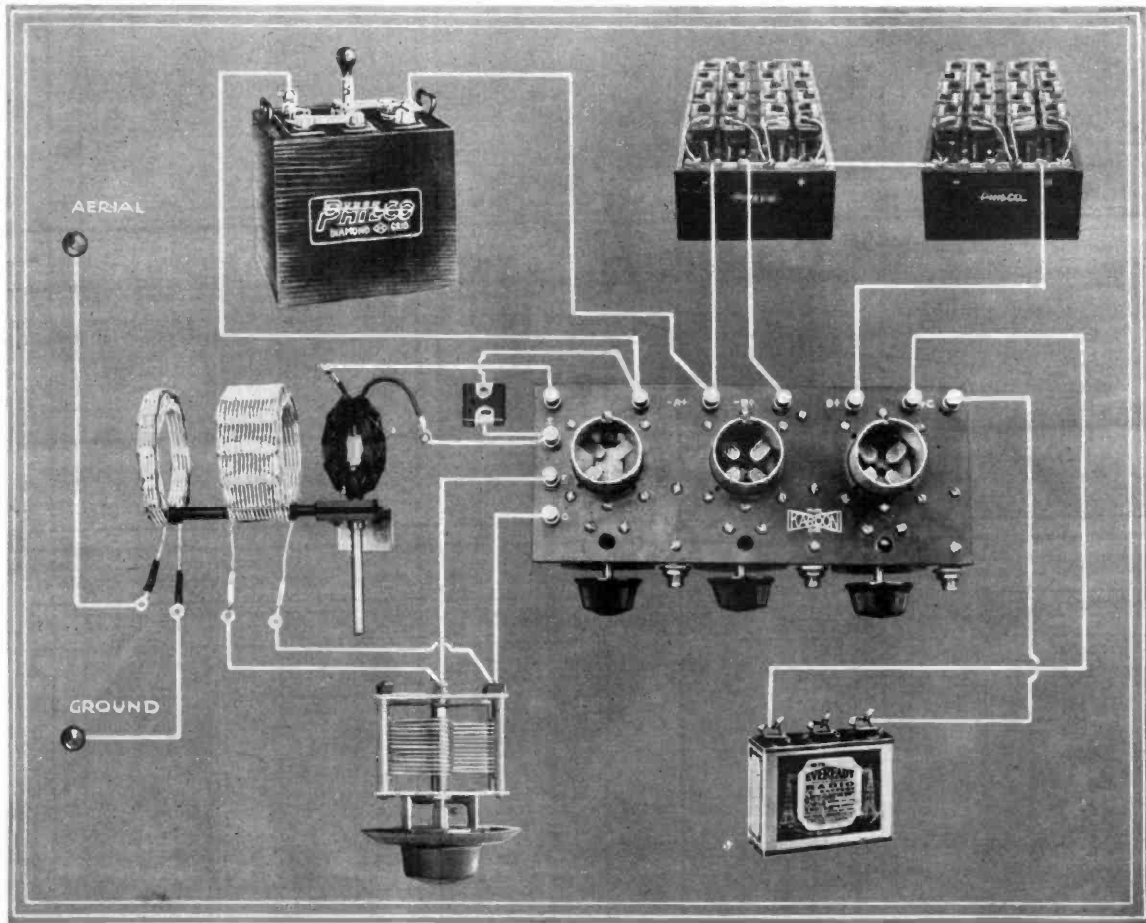
By H. M. N.

he must have maximum efficiency combined with the most extreme simplicity. This means that he must use regeneration.

And yet, when I sit and listen to my own receiving set and have a beautiful concert utterly ruined by the squeals and howls of a regenerative set being unskillfully used by my neighbors, I decidedly hesitate to give hook-ups for any more such circuits.

do I give the famous three-circuit regenerative set for the beginner here?

Because I am showing the first three-circuit tuning coil which I have seen which provides for adjustment in such a way that it will not radiate and which, in fact, works at maximum efficiency when it is so adjusted that there is not a squeal or whistle in it. Thank the Lord for the development of this tuner! The second problem for the novice in radio is in the



perimenter a ready-built unit which can very quickly be hooked up to any new kind of tuning coil which he happens to experiment with, and that saves him the time and the trouble of wiring up and soldering rheostats, sockets, grid condensers, leaks and all the rest of the stuff.

I want to talk first to the absolute beginner.

There are two problems—and each one is a serious one—in recommending the “one best bet” for the utter novice to use for beginning his radio experience. The first of these problems lies in the fact that

In spite of all of the campaigns of education that have been carried on by newspapers and magazines, the owners of regenerative sets still persist in making public nuisances of themselves and ruining radio for all of their neighbors.

Right here and now, addressing myself to the absolute novice, let me give you one statement of fact to guide you in all of your use of regenerative sets. *Every time you hear your set squeal and whistle, you are making an infernal nuisance of yourself to everybody around you and ruining their radio reception.* Why, then,

matter of soldering. Very few beginners have decent soldering outfits; still fewer know how to do a really good soldering job even when they get good outfits.

So I am showing here for the beginner a most efficient set which can be built without soldering, and I am showing for the experimenter not only this new tuning coil, but these handy Kardon units which can be had in all sorts of forms to suit any circuit. The one I am showing here has three sockets, for detector and two stages of audio-frequency amplification, and everything needed is already connected

with the very best kind of workmanship in the soldering and the arranging of short leads. This means that you have sockets, grid condenser and leak, transformers, rheostats, jacks and everything else already connected in standard circuit form, and so, whenever you want to try out a new tuning coil, all you have to do is to hook it up to the unit and you have a loud speaker set.

In addition, and for the especial benefit of the novice who may not want to go into three tubes at the present time, I am showing this tuning coil connected to a single socket for use with only one tube. With this hook-up, the beginner can get his first knowledge of radio and then, when he is satisfied that he likes it and wants it on a loud speaker, he can add two stages of audio-frequency amplification, doing the work himself, or he can get a Kardon unit containing two stages already hooked up and simply connect it across the two binding posts which I am showing for his phones in the single-tube hook-up. This three-cir-

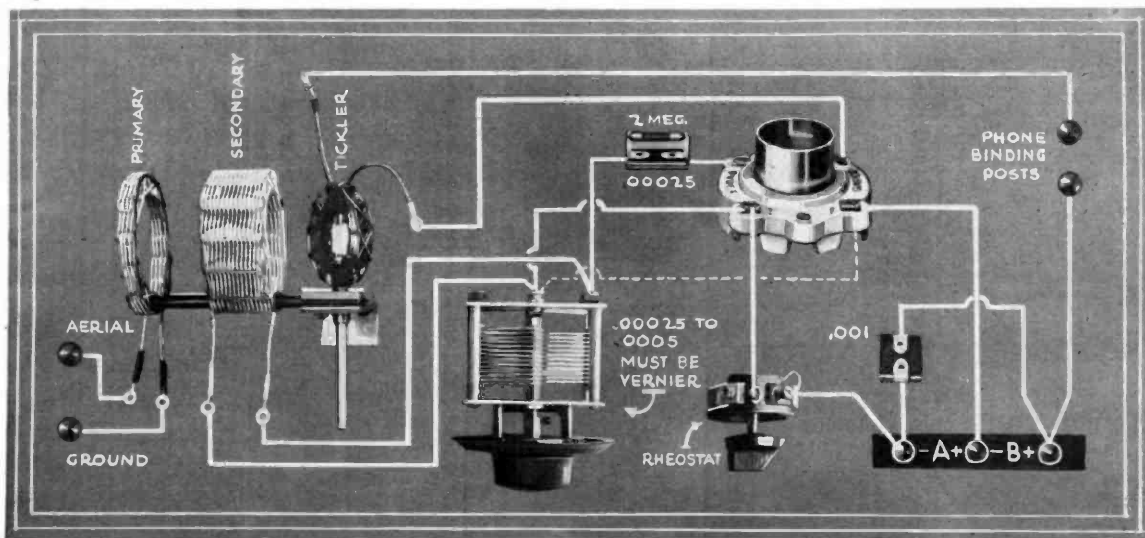
"I'll do more than that," I said. "I'll not only publish the article about it and write it myself, but I will pay you actual cash for the article."

Well, I lost. That is, I lost the bet, but I won the kind of circuit that I have been looking for—a circuit employing all of the advantages of regeneration with the selectivity of a three-circuit tuner, and one which will not radiate if it is properly adjusted in the first place. Fortunately, for this particular unit, its best work is done when it is so adjusted that it does not radiate.

You will note that the low-loss coils making the primary and the secondary are mounted upon two rods of hard rubber. They can be slid along these rods individually. I have found that the best efficiency is gained when the secondary is shoved away from the tickler just far enough to make it impossible to hear a whistle even when the tickler is brought into close

bodies all of the modern developments of low-loss coil design. The wire is No. 18 double cotton-covered and the coils are entirely self-supporting without any dope of any kind. Personally, I am inclined to think that this modern craze to do away with dope entirely is carried a little too far. There are several convenient forms of insulating liquid which are extremely handy to have around the workbench, and are particularly valuable when you are using low-loss coils of this kind.

Some times through accident you may get some of the windings forced away from the others and then, to repair it you can bring them together and apply the lightest kind of touch of dope and the coils will be held in place. At station 3XP, we use the dope known as "Safe-Guard" and we would not be without it. We have even gone so far as to dip two bare wires in this insulation dope, let them dry, twist them together and then try them across 150 volts. The "Safe-Guard" proves to be such a good



Two amplifying tubes can be added here for loud speaker reception. The hook-up as given here is intended for the UV-200 or the C-300 tubes. If other tubes are used, the wire going from the rotor plate of the variable condenser to the filament of the socket should go to the right-hand filament connection as shown by the dotted line instead of the left hand as shown by the solid line.

circuit tuner was developed by W. P. Robinson, of Philadelphia. Mr. Robinson brought it in to my office and smilingly handed it to me with a word of explanation.

"Oh, yes," I said, "here is another of those three-circuit tuners. When you sell this outfit do you also supply one of the new special licenses for superpower broadcasting stations?"

I thought that was clever and the height of sarcasm. But Mr. Robinson very quickly countered.

"No," he said, "I am simply handing you a three-circuit tuner which has all of the efficiency of this very famous circuit, but which, in addition, will not radiate."

I am afraid that I was not very polite in my frank expression of doubt.

"All right," said Mr. Robinson. "You take that out to Station 3XP and hook it up. If you can prove to your own satisfaction that it does not radiate, will you print an article about it?"

coupling with it. The maximum efficiency seems to be at just the distance where a very low sort of growl, which is more a rumble than a growl, can be heard at one particular setting of the tickler, but at no other and where there are no whistles at all.

Then the primary should be moved out almost to the end of the rod. This latter adjustment will depend very much upon your aerial and ground installation.

In his advertising, Mr. Kardon, in presenting his unit to the public, says that a loud speaker set can be built with fifteen wires in fifteen minutes. I am showing with this article a hook-up consisting of seventeen wires. The circuit will work very well with the fifteen wires, but much better results can be gained by using two more wires in order to connect the .001 mfd. micadon condenser from the minus A battery binding post to the binding post from the tickler. This tuning unit em-

insulator that not a bit of current flows across.

I think nothing more need be said about this circuit here. The experienced experimenter will recognize it at once as the standard three-circuit tuner, while the novice can simply connect it as shown here and he will soon learn to work it.

In my single unit, I am showing it connected to one of the new Garod Pyrex glass sockets—one of the finest jobs of socket making that I have seen. These sockets are particularly handy for the novice because he can connect his wires by inserting machine screws in the socket terminals and screwing down.

Still, both the beginner and experienced amateur will get some very important hints on operating this circuit as well as all three-circuit tuners in Mr. Robinson's own article, which I am publishing this month in the department headed, "For the Advanced Student." I (Continued on Page 61)

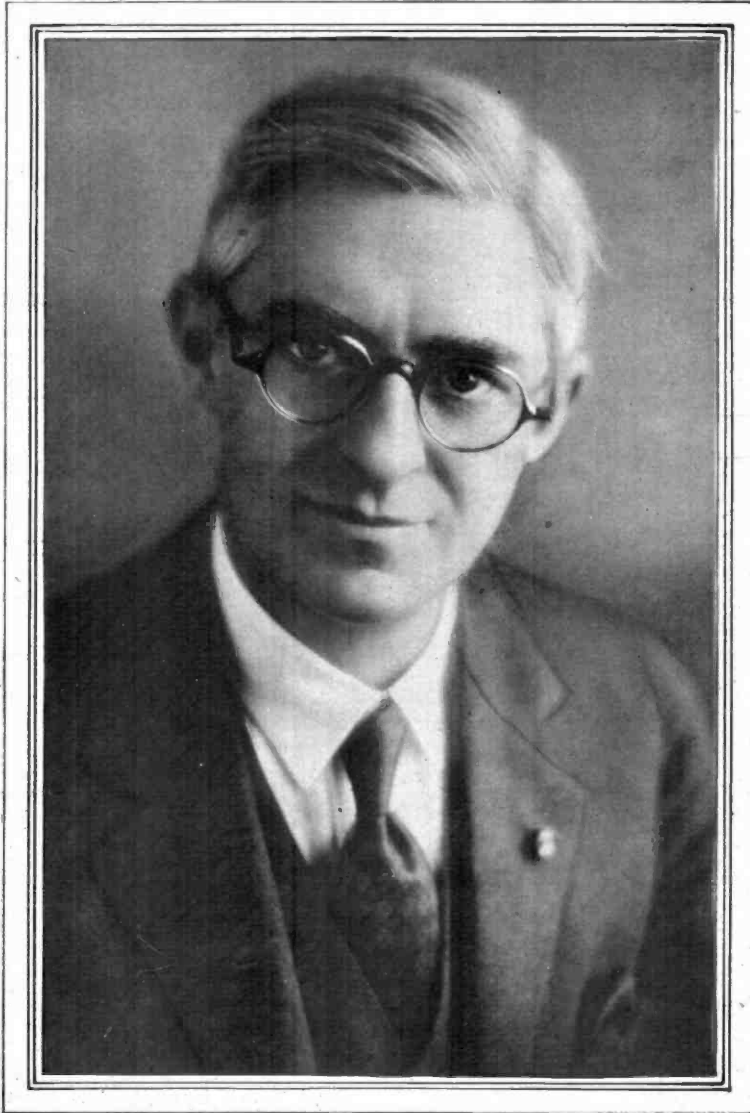
"Uncle John", the Sandman and Little Queen Titania

By VERA BRADY SHIPMAN

WHEN KHJ was young, John Daggett, its newly appointed director, had as yet no official name over the radio. His nephew (the son of Byron Harvey, of Chicago, and grandson of the late Fred Harvey, founder of the gigantic eating house system, of the West, which bears his name), was visiting in Los Angeles. Young Harvey stood before KHJ microphone one evening. Daggett asked him to tell a story to the listening children.

"Oh I can't do that," the boy exclaimed, unconscious of the open microphone. "You do it, Uncle John, you can do it so much better than I!" And it was Uncle John from then, Uncle John whose voice the children and grown-ups, the shut-ins, the affluent and the down-and-outers all love, who brings the unusual talent to KHJ, teaches the children to play fair at home and at school, and impresses upon their elders the responsibility of parenthood.

In private life (if the life of a radio director is ever private) Uncle John is John



"Uncle John" Daggett, director and announcer of KHJ, The Times, Los Angeles, Calif. The most beloved announcer of the West. He is the voice of KHJ

Photo by Witzel

Daggett — a life-long newspaper man and creator of many feature stories. He has been associated with the Times and the West for many years. In fact, Uncle John and KHJ belong to the readers and listeners of the long-established paper. In a recent popularity contest of a weekly radio publication which was won by a Middle West announcer most often heard between the Rockies and the Alleghenies, several admirers of Uncle John wrote in that next time they would see that Uncle John was elected by acclamation, for in numbers KHJ fans might arise in regimental power and swamp the ballot-box.

I visited the Times studio recently and Uncle John greeted me — his white trou-

sers spotless, his white sport shirt sleeves rolled to the elbows, gray hair ruffled and kindly eyes sparkling. Truly here was a busy man! It was "Uncle John, what shall I do about this?" In every direction, Uncle John personally "out-Barnums the show." But when I finally cornered him for a few

minutes and he began to talk thoughtfully of radio—the intensity of his nature fell like a blanket over his impatience. For Uncle John loves to talk about radio. It is to him a living, pulsing thing which is moving mountains.

"I believe that the radio is the greatest single factor invented, so far, for unifying the home and bringing into the home the right kind of thinking," he said seriously, between telephone messages and requests for interviews. "I believe in radio because it is the voice directly to the people. We say that the newspaper is the emblem of service, and the radio represents the newspaper. It watches the shut-ins, it relieves monotony and dullness of everyday lives which should have assistance. Through radio the world can be taught thoughtfully. The radio listener is best prepared to grasp the spoken ideas. His mind is attuned for the program received, for the man tunes in on the radio just because he wants to do it."

A nightly early evening feature of KHJ is the fifteen-minute talk on "Stories of American History," written and delivered by the author, Prof. Walter Sylvester Hertzog, of Hollywood High School. Every evening except Sunday, Prof. Hertzog is on the air with this serial of historical facts. For more than a year his listeners have looked to this knowledge each evening as told by a friend. It is a historical conversation of facts and figures, and is teaching the American public to remember the deeds which have made our country.

A delightful bit of fantasy over KHJ is the Tuesday evening program which is given by Queen Titania, the Sandman and Uncle John—"the Voice of KHJ." Little Titania looks like a truly blond fairy. She is eight years old and has been acting in motion pictures for several years. The stories each week are original continuities written by her father, O. G. Pirie, who is the Sandman himself. These stories are thirty minutes in length and are read from the manuscript.

The programs began in September, 1923, and have continued without missing a Tuesday, until September, 1924, marked the fifty-fourth consecutive program. The stories carry the listeners into the Land of Right Thought and Right Action. Radioland is often taken across Slumber Sea into the Land of Ought to Be.

It was eight months before Uncle John persuaded the author to make his identity known, for the mystery which surrounded the Queen and the Sandman was woven deeper with each week's performance. But the little lady is always known as Queen

Titania. Her home-life is simple, her schoolwork carried on daily under her mother's personal guidance.

Appreciative listeners have sent Queen Titania every conceivable gift from a live alligator to silk bed comforters, dolls and bracelets. Her little room in the modest home on La Mirada avenue is filled with mementos from unseen friends. Some one named her "The Fairy of the Microphone," and the name remains as befitting. Grown-ups as well as children enjoy her little voice. On her eighth birthday, which was the ninth of October, the artists of KHJ gave a voluntary complimentary concert in her honor, each one taking part in appreciation of the Tuesday night broadcast by the little Queen.

The evening that I visited KHJ, Queen Titania was quietly waiting for her part of the program. She climbed up into the lap of one of the staff entertainers and sat there with her little arm around his neck and her head bent to his shoulder. Just a natural little girl, unspoiled and lovable!

The continuities of Tuesday's programs have lately been put in book form and were published last fall. These books may be had through Uncle John, who promises that every copy will be autographed by Queen Titania, herself. Special arrangements are being made, through KHJ, that children who cannot afford to buy the book will be given copies.

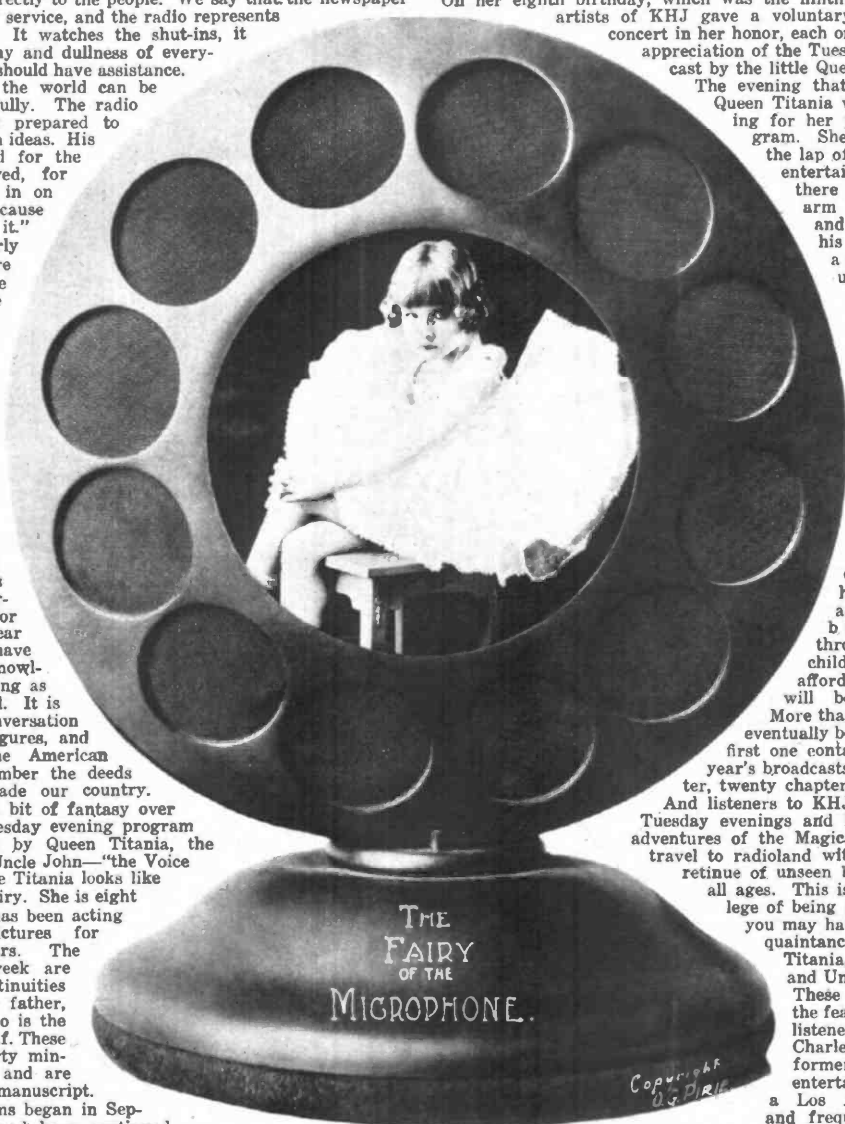
More than one volume will eventually be published as the first one contains but half the year's broadcasts, each as a chapter, twenty chapters in all. And listeners to KHJ can tune in on Tuesday evenings and hear the further adventures of the Magical Three as they travel to radioland with their listening retinue of unseen boys and girls of all ages. This is the extra privilege of being a KHJ listener—you may have a listening acquaintance with Queen Titania, the Sandman and Uncle John!

These are but a few of the features planned for listeners by Uncle John. Charles Wellman, a former Chicago radio entertainer, who is now a Los Angeles resident and frequent soloist over KHJ, has just published a song of "Uncle John-KHJ Radio," and if you tune in at the right time you'll hear him singing it too.

There are canary birds in the various corners of the studio. The cages are put down near the microphone sometimes and the listeners can hear them sing. The birds are a part of Uncle John's homelike surroundings. They just belong to Uncle John as a part of the family tree.

Uncle John says that KHJ stands for Kindness, Happiness and Joy—and if you listen in and hear the

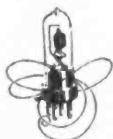
(Continued on Page 49)



"Queen Titania," fairy of the microphone, who with "Uncle John" and the Sandman, broadcasts a story each Tuesday night from KHJ

Photo Copyright by O. G. Pirie

Grimes Takes the Hum Out of His "3XP"



FOR the benefit of the many new readers who have joined us since the price of this magazine was reduced to ten cents, it may be well to explain that Mr. Grimes, inventor of the famous inverse duplex system, developed what is known commercially as the "Grimes-3XP" set in the laboratory of this magazine, station 3XP, at Delanco, N. J.

Our first announcement of the circuit with complete details for building it was given in our issue of last June. In the July number we printed an article on "Trouble Shooting in the Grimes-3XP," and with that article gave the 3XP-style wire-up for the set. In the August issue we gave the same circuit adapted to use ordinary neutroformers.

This set must not be confused with the inverse duplex neutrodyne nor the inverse duplex Pfanstiel. Mr. Grimes' idea of inverse duplexing is a system which may be applied to any circuit in order to cut down the number of tubes, and consequently the expense for operating and the drain on the batteries. The Grimes-3XP is a circuit developed with this system, and in its present form uses three tubes and a fixed crystal detector in such a way that the set readily has two stages of radio-frequency amplification, detector and three stages of audio amplification.
H. M. N.

By DAVID GRIMES

Associate Editor of Radio in the Home

ONCE again, the general release of latest information on the inverse duplex system has greatly helped the work of development. With all the many enthusiasts trying out the various combinations and adaptations of our system, some of them were sure to run across new and interesting peculiarities of the circuits.

Radio is never found alike in any two places. So much depends on surrounding country, types of aerials, etc., etc. For us to run tests under all conceivable conditions would require hundreds of years, and while we are always hopeful of reaching old age, one can never tell when some peevish victim of our circuits might rudely interrupt our work by committing murder.

Well, it appears that in some localities, the inverse duplex combination described in the June and July issues, presented some annoyance in the form of a hum on the middle dial. This hum sometimes acts one way and sometimes another. We were not much bothered by it, which explains why nothing was done here to eliminate it. When various letters started pouring in from widely separated sections of our fair land, we concluded that perhaps we didn't know the whole story. Subsequent tests proved this

and a change was accordingly made in the hook-up. Strangely enough, nearly a year ago, at the beginning of the tuned radio inverse duplex, this change was suggested, but there never seemed to be any call for making it till now.

In order to familiarize yourself with this difficulty, we suggest that you study the following symptoms thoroughly. You may be fortunate enough to pay rent in a community free from this center dial hum in the 3XP inverse duplex. If you do, you have our permission to throw this article out of the window. If you do not, you will undoubtedly

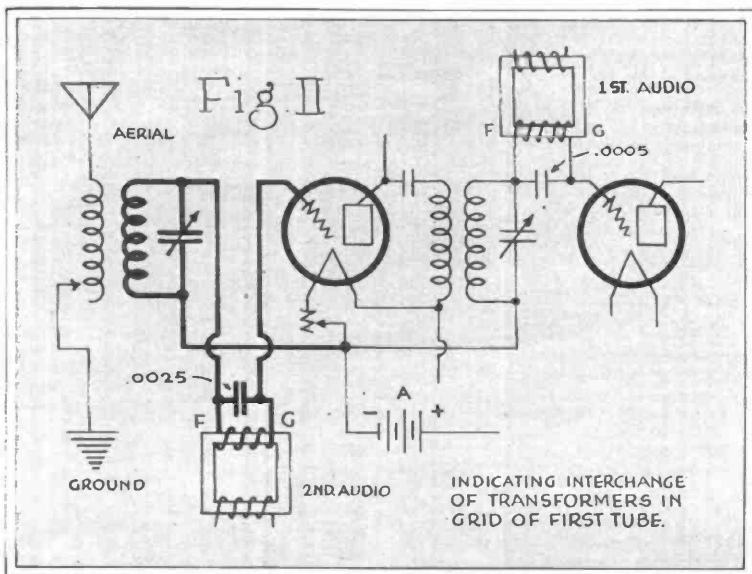
welcome it with fully charged batteries and microphonic tubes.

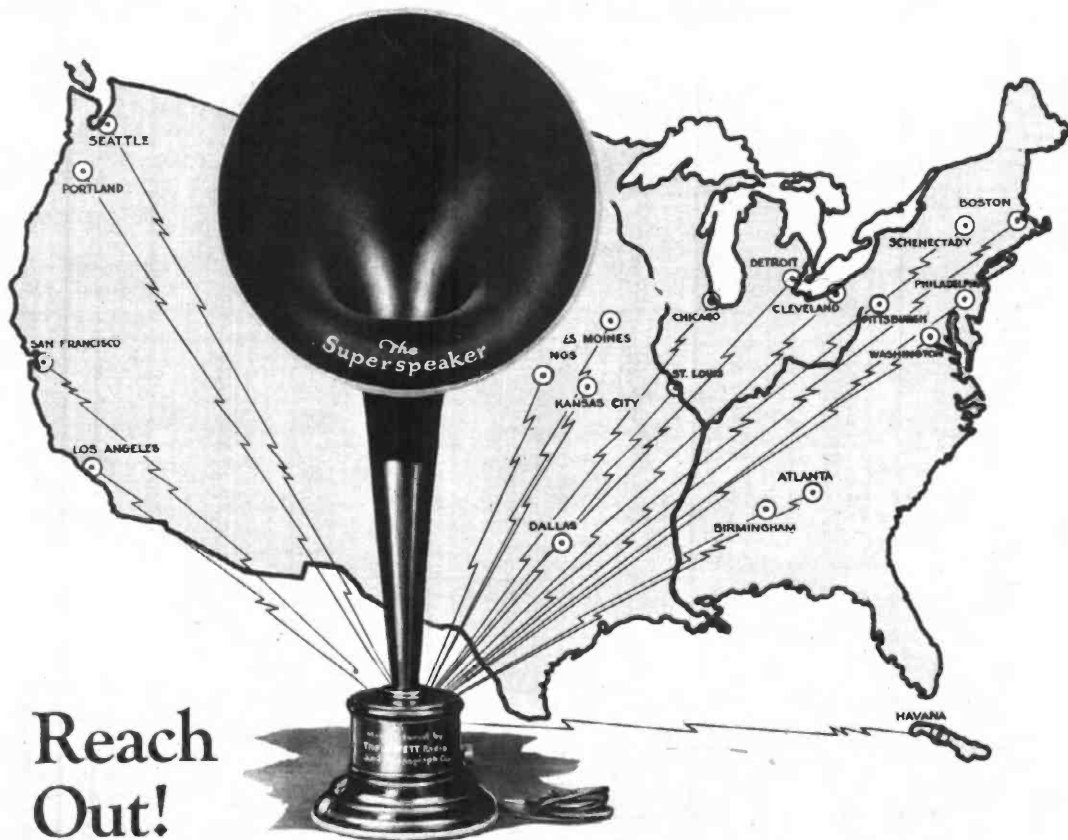
With certain types of loud speakers, certain experimenters have noticed a squeal when placing one hand near the speaker cord and the other hand near the center dial. When employing some makes of headphones, the operator was unable to approach anywhere near the center dial without the poor old set emitting a cry of fear, blood-curdling enough to suit any follower of Sherlock Holmes. In either case it is no fault of the reproducing unit. Technically speaking, the loud speaker and the phones were simply too high in impedance.

The above is only one of the symptoms. You may not have experienced that one, but you may have been extremely puzzled by the problem we are about to outline. The latter difficulty has been nicknamed by several fans as an AC hum. It reminds one of almost anything from the low buzzing of a bumble bee to the loud hum of a buzz saw, depending on one's temper at the time. Some of the complaining letters were censored by H. M. N. before being sent to me; so as to spare me the shock of knowing what some of them sounded like. This hum appeared to grow louder toward midnight in several cities, while others reported that it only occurred when the operator of the set placed his hand near the middle dial.

The AC hum symptom was present on both the loud speaker and the telephones. When referring to this middle dial, we mean the tuning condenser on the second radio amplifying tube, which incidentally happens to be the first audio stage.

In clearing up such a case of trouble as this, the first necessary thing to do was to locate a place where the trouble on the set could be experienced. This was finally found, and from then on the thing was fairly simple. We proceeded to incorporate the suggested change of nearly a year ago. Now let's get real technical. Every sort of multi-tube





Reach Out!

Loud-Speaker reception from nearby stations will be only a small part of your enjoyment of a Superspeaker and a modern Radio Set.

The air is full of music and voice from far and near. Nearly 100 high powered stations are begging admission to your home theater.

Tune your set to the entertainment that suits you best. Through the graceful throat of the Superspeaker, reception will come in naturally, clearly, and with amazing volume.

For The Superspeaker is a true musical instrument. It is the work of experienced musical instrument builders. In design, materials, workmanship and performance, it differs notably from all other devices of its kind.

Regardless of the size or power of your set—regardless too, of your prior experience in amplified reception—Superspeaker performance will surprise and delight you. Just ask any of the thousands of Superspeaker users from coast to coast.

Enjoy your home theater to the full limit of its possibilities.

Install a Superspeaker and sweep the ether!

A big, substantial instrument, 26 inches high, with 14-inch bell, and weighing over 5 pounds—Handsome finished in ebony gloss—Needs no extra batteries or coils—Adjustable for volume—Wears forever—Built complete in our own plants at Detroit and Allegan, and backed by the guarantee of a million-dollar corporation. List price \$30. (West of the Rockies, \$32.50). Ask your dealer.



THE SUPERSPEAKER
For Homes or Public Reception.

THE SUPERSPEAKER UNIT
Makes a Loud Speaker out of Your Phonograph.

THE JEWETT PARKAY CABINET
With Parquetry Top—All Standard Panel Sizes.

THE JEWETT ADAPTO CABINET
Houses Any Set and Equipment—Superspeaker built-in.

THE JEWETT MICRO-DIAL
Makes Tuning 50 Times as Accurate.

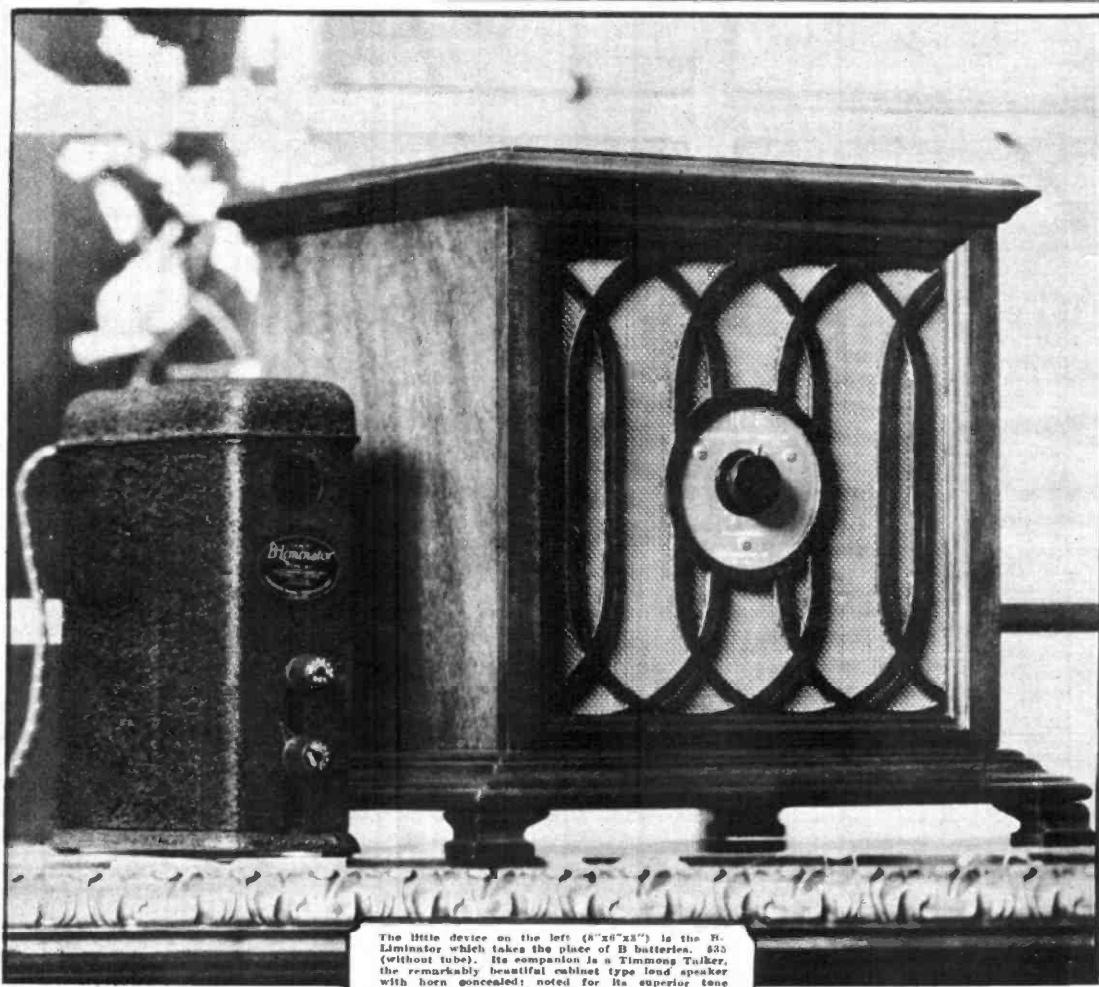
JEWETT RADIO & PHONOGRAPH COMPANY

5682 TWELFTH STREET

DETROIT, MICHIGAN

The Superspeaker

*Two of
The Biggest Things
in Radio Today*



The little device on the left (8"x6"x3") is the H-Liminator which takes the place of B batteries. \$35 (without tube). Its companion is a Timmons Talker, the remarkably beautiful cabinet type loud speaker with horn concealed; noted for its superior tone purity and volume. Type A, \$35.00

TIMMONS

Making a Name a Household Word

Radio—young in years, mature in achievement—is forging names prominent in the industry into household words.

Go anywhere—north, south, east or west—and you will find the name "Timmons" known there. Timmons Talkers have blazed the way of the cabinet type loud speaker, for Timmons Talkers are pioneers of this type. And it was the Timmons B-Liminator that proved alternating house current could be used in place of radio B batteries.

Writing in the New York World of apparatus to take the place of B batteries, Captain Robert Schofield Wood, expert and authority on radio, said, in part: ". . . Foremost among the worthwhile apparatus of this type is the Timmons B-Liminator. . . . The difference that exists between the B-Liminator and the regular B battery is about the same as looking at a picture with the naked eye and then through a stereoscope."*

Andrew McLean Parker, radio expert and radio editor of the Camden, N. J. Post Telegram, after trying out a B-Liminator on all types of circuits and sets, said in October 6th issue of his paper: "One of the big problems of the radio age has been solved. Engineers, after several years of effort, have succeeded in perfecting a device which makes a B battery out of an electric light socket. . . . There have been many attempts to do this, but

the first successful device we have seen is the product of Timmons Radio Products Corporation of Philadelphia. It's called the B-Liminator."*

These men, whose radio following number hundreds of thousands, are always sure of the ground and facts before they speak. They are authorities on radio just as Fritz Reiner, Conductor of the Cincinnati Symphony Orchestra, is a foremost authority on tone. With Mr. Reiner's permission, we will quote from a letter which he sent us recently. In part, he said: "In my experience with loud-speakers for radio sets, the Timmons Talker is by far the most perfect reproducer."

Here you can see why the name "Timmons" has forged to the front rank of radio. First, because it has always been coupled with vision. The Timmons Laboratories are always looking and working ahead, planning greater and greater developments in radio. Second, because authorities and radio enthusiasts everywhere recognize that a Timmons product has been fully developed before being marketed. And finally, because all Timmons Products are unqualifiedly guaranteed.

Good dealers everywhere carry the Timmons line and will give you literature on Timmons Radio Products. Or we will send any of this literature direct and promptly.

* We'll send either or both of these complete articles.

TIMMONS RADIO PRODUCTS CORPORATION

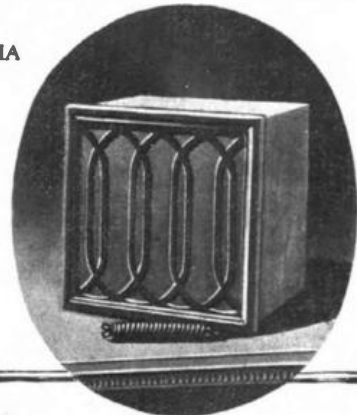
GERMANTOWN



PHILADELPHIA

Timmons Talkers
TIMMONS
B-Liminator

Timmons quality also built into a more modest cabinet for the thrifty buyer who realizes the advantage of recessing horn and mechanism, but prefers a loud speaker at a lower price. Type N, \$19.00.



Radio Products



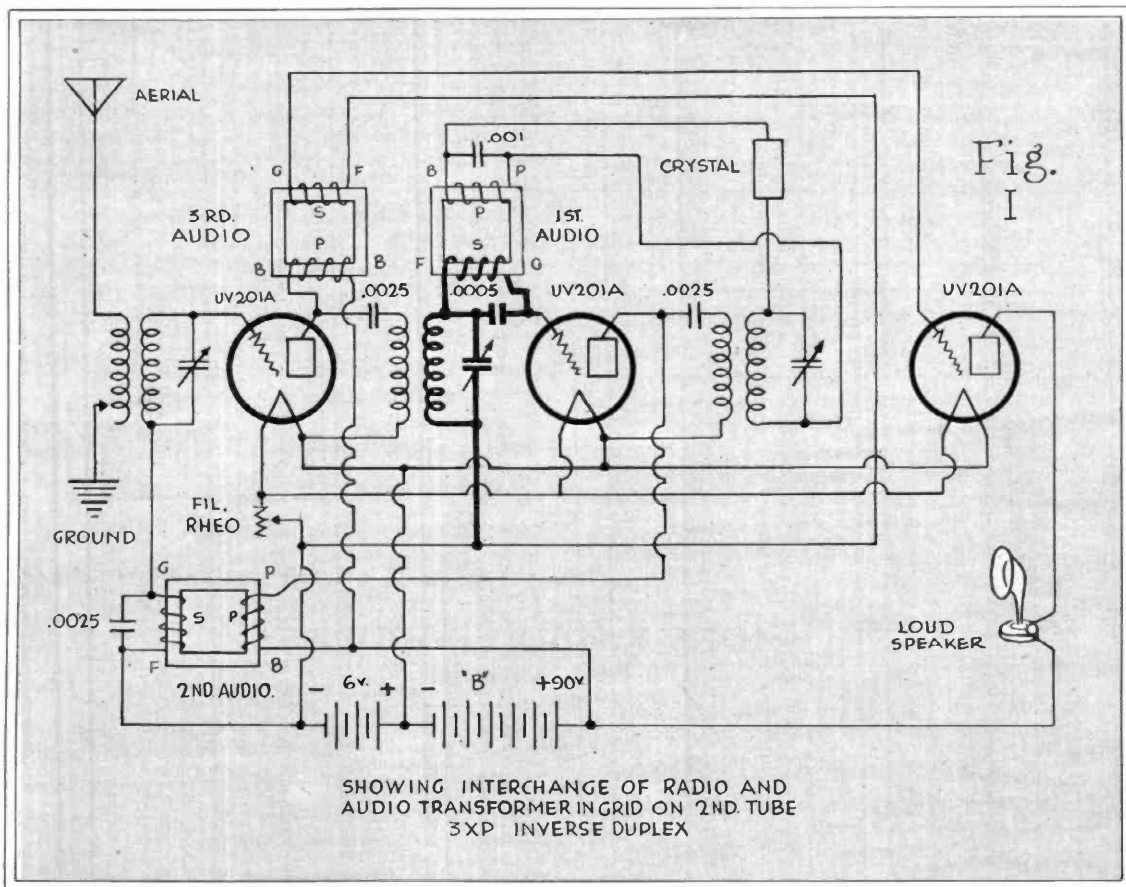
reflex or inverse duplex in the past has always had the radio-frequency transformers located next to the grids of the tubes. Thus, the audio currents, in traveling from the high side of the audio secondary to the grid of the tube, would pass through the radio-frequency apparatus. This was all well and good so long as the radio transformers were separated somewhat and were mounted way back in the set away from the body capacity effect of the operator. In the days of fixed radio transformers everything was lovely because the fixed radio transformers could be

near this condenser it gives the same effect as touching the grid terminal of the audio transformer, which, of course, you know, usually produces a loud squeal or hum.

Sometimes, the effect of audio induction hum is so slight that several stages of audio amplification are required to make it objectionable. This is exactly the case with the 3XP inverse duplex and the reason for the center dial hum. The center tuning condenser is the one connected with the high side of the first audio amplification stage. The slightest induction hum here is magnified greatly by the following two audio stages into the horn or phones. The left-hand or first tuning condenser is on the

secondary of this first audio. In this position it is grounded so far as any audio induction hum is concerned. The operator's hand in approaching the middle tuning condenser no longer is, in effect, touching the audio grid, but is, in reality, touching the audio-filament circuit. Presto—the hum and squeal have gone!

It will be noticed, however, that the tuning on this center dial has dropped several degrees. This is because the audio transformer, between this condenser and grid, has a small capacity between the secondary and primary winding. This is equivalent to placing a small fixed condenser across your variable tuning condenser. The set-



placed entirely away from body capacity effects on the hands of the operator.

Now with tuned radio frequency becoming generally employed, a different situation arises. The 3XP inverse duplex uses tuned radio-frequency amplification. The tuning condensers, that are connected directly across the radio transformers, are also in the grid circuit of the audio transformers. These tuning condensers, then, are really the grid terminals of the audio transformers and the worst part of the trouble is that the condensers are large in area, capable of picking up the least little audio noise. When you bring your hand

second audio stage, so induction hum is not noticeable on this. The right-hand tuning dial or the third one is connected across the detector, with no audio apparatus in the grid circuit. No audio induction hum is therefore noticed here.

Probably you have already figured out the remedy. Here it is, anyway.

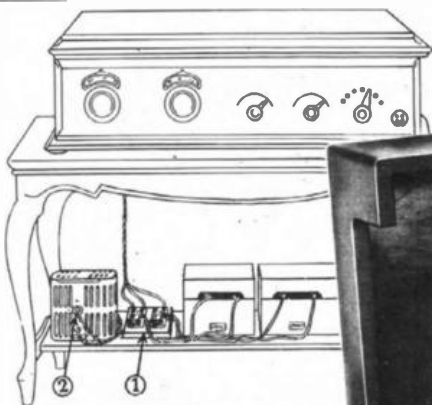
Why not interchange the positions of the radio and audio transformers in the grid circuit of this second tube? Referring to Fig. 1, you will see the 3XP inverse duplex with this shift made accordingly. Now the tuning condenser on the radio transformer is on the low or filament side of the

tuning on the middle dial for any certain station is therefore dropped in proportion to the size of this small secondary-primary capacity in the audio transformer.

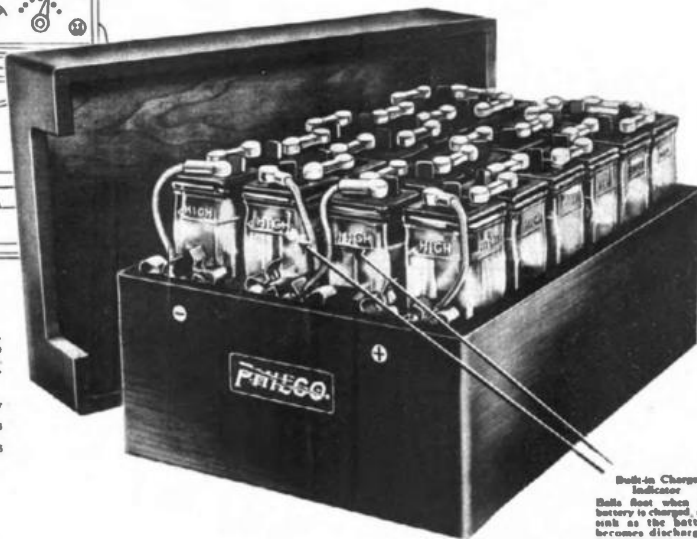
If you care to carry this still further, you may interchange the radio and audio transformers in the grid circuit of the first tube also. This is usually not required, because this tube is the second audio and is not so susceptible to hand induction hum. However, there are some aerials, located near to power lines, that bring in a hum



(Continued on Page 55)



Philco "B" Batteries on Charge
 To connect the batteries to your set, throw over switches on Charging Panel (1) and pull out plug (2) disconnecting the Philco Charger, similar to A B C Philco Type DX "B" Battery with drume mahogany finish case with cover—\$20.00
 Type DXD, without cover—\$16.50
 Type Charging Panel, factory wired and ready for use—\$1.75
 Philco Single Charger for all "B" batteries and UD44 "A" batteries. Noiseless. Price—\$9.75
 Philco Double Charger for all "B" batteries and UD66 "A" batteries. Noiseless. Price \$15.00
 Charger prices include plugs and receptacles.



Built-in Charge Indicator
 Balls float when the battery is charged, and sink as the battery becomes discharged.

Recharge in your living room without changing a wire!



Philco Frosted-Glass Case "A" Batteries

Spray-proof. Stay dry and clean always. Built-in Charge Indicators.
 Type UD66 for storage battery tubes—\$16.00
 Type UD44, "a dry cell replacement" enabling you to get better results out of dry cell tubes. On uppers iron space than three dry cell tubes and may be installed permanently in the radio cabinet. Price—\$8.00



Philco Mahogany-Grain Case "B" Batteries

Types RAR and BW for storage battery tubes. In beautiful Adam brown mahogany finish cases harmonizing with your radio cabinet. Price—\$14.50 up.
 Philco Charge Tester permanently mounted in filler cap avoids fussing with a hydrometer—\$1.00 extra

You need storage "B" batteries because clear and distant radio reception depends on steady, non-drooping voltage and strong, hum-free current.

Philco has made the use of "B" storage batteries more convenient than the frequent renewal of dry cells—and far more economical, too.

To Recharge—just throw the Charging Panel switches and insert the plug in the Philco NOISELESS Charger. Cost—five to ten cents.

You don't move the batteries nor disconnect a wire. You avoid all danger of getting positive and negative mixed and burning out tubes.

Clean, Dry and Beautiful. The tightly sealed glass cells are assembled in Adam-brown mahogany-finish cases, harmonizing with radio cabinets and furniture.

Built-in Charge Indicator. Tells you at a glance how much charge is in the battery at any time. Does away with the old-fashioned hydrometer.

Dynamic—Fresh. Philco Radio Batteries are shipped to your dealers Dynamic—CHARGED but absolutely DRY. He carries them in stock just as Victrola Records or tubes. *There's no deterioration* because the life of a Philco Radio Battery does not start until you or your dealer pours in the electrolyte. This insures your getting a fresh, new, power-packed battery.

You can buy Philco "B" Batteries and Chargers—also Philco "A" Batteries of similar convenience—at your nearest Philco Service Station, Radio or Music Dealer.

Philadelphia Storage Battery Company, Philadelphia

PHILCO DYNAMIC RADIO BATTERIES

MOTOR CAR OWNERS—avoid the danger and humiliations of battery failure by installing high-powered, long-life Philco Diamond-Grid Batteries. With Philco Retainers, they are **GUARANTEED FOR TWO YEARS.** Philco made automobile batteries range in exchange price from \$14.95 up.

Notes on Our Inverse-Duplex

By H. M. N.

A MOST unfortunate error crept into one of our diagrams of the inverse duplex Pfanstiehl system given in the November number of this magazine. Turn to diagram No. 4 at the bottom of Page 20 and refer to the first audio-frequency transformer on the left-hand side numbered 8. There is a wire going from the plate binding post of that transformer to the left-hand side of fixed condenser No. 5.

This wire should run from the plate binding post to the right-hand side of condenser No. 5 instead of to the left-hand side. As it is shown in the diagram it will short-circuit the "B" battery.

This is the first mistake we have made in the 3XP-style wire-ups, and if you burned out a dozen transformers, you could not feel worse about it than we do.

The only compensation is that the wire was correctly given in our check-up list with the article.

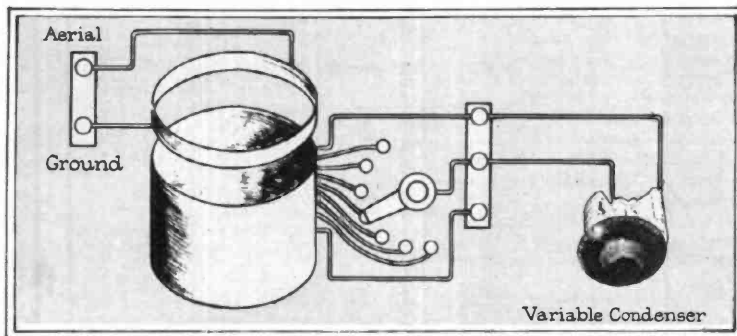
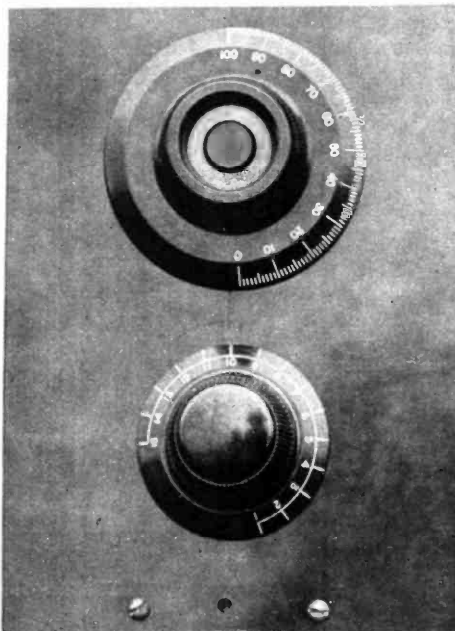
And then, on Page 49 of the November issue, in the check-up list for diagram 4, in the sixth paragraph, the proofreader failed to catch an error, although it is not a vital error. The paragraph begins, "from the positive connection of socket No. 14." Of course that word "positive" should be "plate."

If you are using either the inverse duplex neutrodyne or the inverse duplex Pfanstiehl in connec-

you will get maximum efficiency from them, and even at that point your signals are likely to be spoiled by a hissing or frying noise all the time. These "A" tubes are much quieter in operation and, although they do not give quite the volume, I have personally found the substitution to be well worth while on account of the unquestioned improvement in the quality of reception.

Of course, the substitution of the A tubes here, makes the entire set work on four hard tubes, thus making it possible to use the set with dry cells for your "A" battery. This requires eight dry cells hooked up in what we call "series-parallel"—that is, you divide your dry cells into two sets of four each. Each set is wired together, center binding post of one cell to side binding post of the other cell, and then, with the two sets of four wired up individually in this way, the two sets themselves are wired together with the side binding post of one connected to the side binding post of the other, and the center binding post of one connected to the center binding post of the other. The whole set of eight is then treated as one battery and the negative filament lead is taken from either of the two side binding posts, and the positive filament lead for the set is taken from either one of the two

(Continued on Page 51)

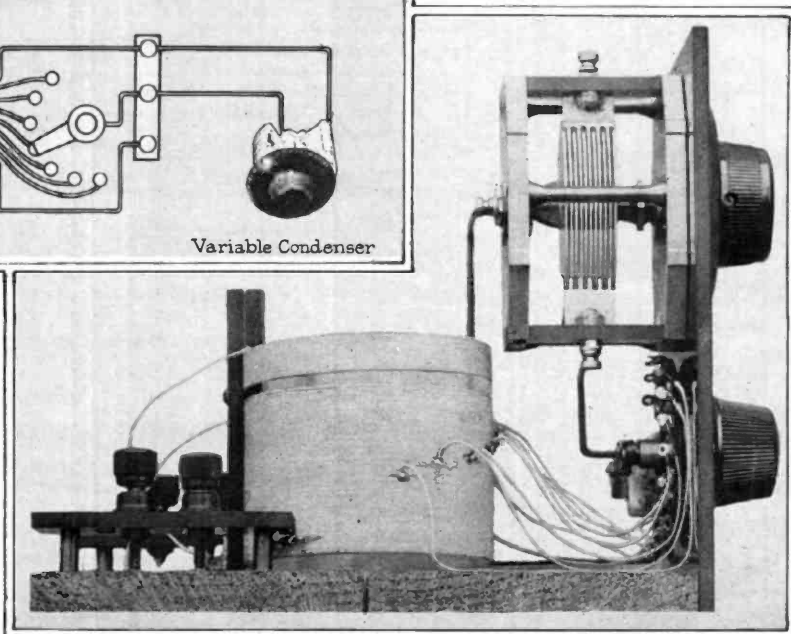


This drawing shows graphically how the connections are made for the aerial adaptor

tion with your outdoor antenna, you can improve the quality of the signals by substituting a UV-201A or C-301A detector tube in place of a UV-200 or the C-300 as specified in our articles in the September issue and November issue about these two circuits.

The 200 and 300 tubes are unquestionably the most sensitive detector tubes which we have on the market now and produce the loudest signals. They are, however, very uneven in operation and are very "spotty." That is, there is just one definite point on the rheostat where

Above is a view of the front panel, while below is a side view of our aerial adaptor



Your family will be loyal to the set you give them

But—

They'll soon hear the sets your friends and neighbors got for Christmas. They'll hear sets that *reach* out across the continent and that *ring* out with a splendid volume—sweet and clear and brilliant as the cold night air.

Then they'll swallow a little hard and do their best to champion the set *you* gave them. It will touch your heart to hear their loyalty to *your* set when *you* know that it isn't quite the best.

Give them a—

Sleeper

MONOTROL

REG. U.S. PAT. OFF.



"HOW TO CHOOSE A RADIO"

Do not make the usual mistakes in radio selection. This unique booklet tells you just what radio improvements to look for and expect in 1925. It is for the use of all who wish to follow sure guide-posts in selection of a radio set. FREE copy on request. Write for booklet.

—and make proud members of a family who would otherwise be simply loyal to your choice. In the Monotrol you give a set which never needs defense—which counters other claims by "going them one better"—a set that's good not only now but for years to come and that for absolute beauty of appearance, with simplicity of tuning, "pick up" and long range power, has few, if any, equals in the field.

No other has such natural tone—a tone absolutely equalized by the new Monotrol principle of audio amplification. No other has such tremendous reserve power that "carries through" from feeble or from distant stations when other sets are helpless.

No set is more dependable, more sure and more likely to meet the future demands of radio reception as well as those we know now. The Monotrol is selective as only tuned radio frequency could make it—powerful and far-reaching, with three stages of radio and three of audio amplification—yet its simplicity of control is its most distinctive feature.

Write for booklet "How to Choose a Radio" and by all means see, hear and operate the Monotrol before you choose a Christmas set. Your dealer will install it for FREE trial and let you buy, if desired, on the most convenient terms of payment.

SLEEPER RADIO CORPORATION

432 Washington Avenue
CHICAGO
10 South La Salle Street

Long Island City, N. Y.
SAN FRANCISCO
111 New Montgomery Street



Oh Boy—what fun! Big fights, sports, real music, talks crammed full of interest. All yours by radio—with a *Matched Tone* Headset!

The *Matched Tone* makes both ears hear the same sound at the same instant. It gives you every syllable—clear, lifelike, vividly real. Get the world's fun—and get it all—with a Brandes.

Brandes

The name

to know

in Radio



Superior
Matched Tone
Headset
\$6
\$7 in Canada



Table-Talker
\$10
Special to you
of the Backus
in Canada \$12



Navy Typo
Matched Tone
Headset
\$8
\$9 in Canada

Meet Miss Mulholland of "Roxie's Gang"

By MARY GRAY REED

"ARE you a New Yorker?" I asked Florence Mulholland. "For goodness sakes! Just look at me! Do I look like a New Yorker?" We were sitting on the stairs outside of Roxie's studio at the Capitol, where the regular Sunday evening program was being broadcast and as the light wasn't very good, I had to peer under the broad brim of her hat, before I could answer her question.

One good look, however, was enough. Certainly Florence Mulholland was not a New Yorker. If that good, old-fashioned word, *buxom*, were not in disuse, I should use it to apply to her. She is a whiff of the outdoors with her wholesome good

As we sat on the stairs with folks from the studio constantly climbing over us, around us and about us, I asked Miss Mulholland what her hobby might be. Her dimples deepened gayly and she blushed as only an out-of-door girl can blush, while she said,

"Promise me you won't laugh at me. Let me see how I can keep it from sounding funny."

And what do you think this hobby is? House-cleaning and interior decorating! The first is certainly an inheritance from her pilgrim stock and the second is a carrying-over of the artistic temperament which enabled her to sing before she could talk.



Florence Mulholland

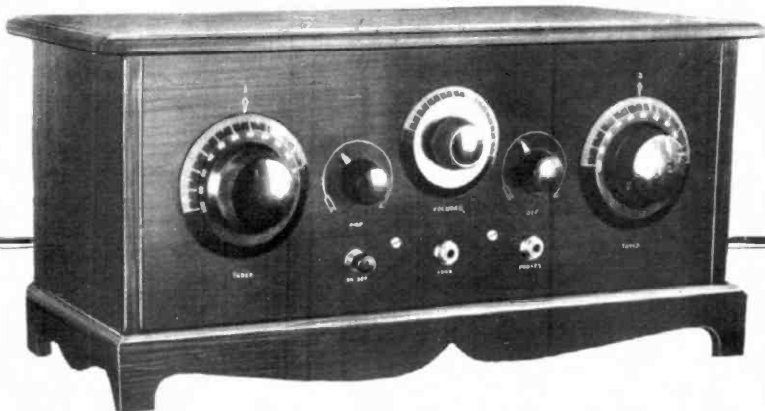
looks; her natural high color and her large bright eyes.

From Onieda County in New York State, came this famous lassie to study singing in New York at the age of seventeen. She had no intention of deserting her beloved woods and fields but almost immediately, she found herself singing in the chorus of the Brick Church in New York, and now she can only go home at intervals to revel in the stars above, in the open spaces, and the fresh water in their well.

You know her best, probably, for the Scotch folk songs which she has been singing on the stage of the Capitol Theatre in New York for some time and which you have certainly heard on Sunday evenings, during the past two years, as she does her bit with "Roxie's Gang." The fair for this, she undoubtedly inherits from her Scotch grandmother who crooned to her when she was young and so her favorite tunes today are, "My Ain Folk," "Bonny Dundee" and "The Hundred Pipers."

"I know," she said, "that if these were the days of heraldry, my coat-of-arms would be a mop and broom. I can get more real thrill and kick out of rearranging a room than I can out of singing an aria. To tell the truth, I am moving down two flights of stairs into an identical apartment, just for the fun of fixing up again. The spirit may move me to rearrange my room at any hour of the day or night, even three o'clock in the morning. And believe me," she added with conviction, "When I clean, I clean."

They say about the studio that she is the most motherly person in it. Every one wants to confide in her and she is always helping people who are in trouble. I can't help wondering which of these two tendencies of Miss Mulholland will win out in the end. Will she continue to charm audiences with her beautiful voice or will she become one of the few perfect housewives of today? Or will she be one of those supremely fortunate individuals who finds it possible to combine the two vocations?



Build the 3-tube Counterflex with this complete Harkness Kit



The instantaneous and increasing popularity of the new Harkness Counterflex circuit is a good indication of its merits. Harkness fans all agree that it is the best yet—and the number of Harkness fans is increasing daily. Now Mr. Harkness has added the finishing touches to the 3-tube Counterflex circuit, simplified it a little, and made it just about the most worthwhile 3-tube circuit ever devised. This new, simplified 3-tube Counterflex receiver is very easy to build, especially if you use the complete set of parts contained in the genuine Harkness Counterflex Kit, illustrated on the left. The parts in this kit were designed by Mr. Harkness himself and are manufactured under his direct supervision. They are specially prepared to simplify the work of construction. The 7"x18" bakelite front panel is completely drilled and engraved. The three tube socket shells are securely fastened to a separate panel which mounts behind the front panel and beneath which are mounted the audio-frequency transformers. In fact, the parts in this kit are so arranged that, with only a screwdriver, you can put the set together in just a few moments. An instruction booklet, supplied with each kit, shows you how to assemble and wire the receiver. The illustrations in this booklet clearly depict each progressive step in the assembly and wiring, so that you can't possibly make a mistake.

Harkness 3-tube Counterflex Kit \$39.50

This kit contains all the parts to build the commercial model of the new simplified 3-tube Harkness Counterflex Receiver as illustrated at the top of this page. Cabinet not included.

Harkness 2-tube Reflex Kit \$35.00

This kit contains all the parts to build the famous 2-tube Harkness Reflex Receiver. This is the set which put efficient radio reception within the reach of all. The receiver is "self-neutralized," does not whistle or squeal and cannot cause interference to others. It has only two operating controls. Complete building instructions enclosed with each kit.

Try this new Harkness circuit. The kit is not expensive and is really quite a bargain when you consider the quality of the parts and the efficiency of the receiver you can build with them. Any other receiver with the volume, selectivity and receiving range of the Harkness Counterflex would cost you two or three times as much.

Ask your dealer for the genuine Harkness Counterflex Kit and look for Mr. Harkness' signature on the label. Avoid cheap imitations. If your dealer does not stock genuine Harkness products, send your order directly to us, giving your dealer's name and address.

HARKNESS

DEPENDABLE RADIO PRODUCTS

Manufactured by
KENNETH HARKNESS RADIO CORPORATION
 727-739 Frelinghuysen Avenue, Newark, N. J.
KENNETH HARKNESS
 President

Mail this Coupon for Illustrated Book

Kenneth Harkness Radio Corporation,
 727-739 Frelinghuysen Avenue,
 Newark, N. J.

KH 1-25

Please send me a copy of your illustrated booklet describing the commercial model of the new, simplified 3-tube Harkness Counterflex receiver with detailed building instructions and step-by-step wiring diagrams. I inclose 25 cents to cover cost of handling and mailing.

Name
 Address



An easy way to get distant stations more clearly

IF YOU want clear radio reception—with more freedom from those disturbing noises—you must have clean, perfect contact between tubes and sockets. It's the contact that counts.

Perfect Contact assured with Na-Ald De Luxe Sockets. Broad wiping surface of four special dipped phosphor bronze socket clips press both on sides and ends of tube terminals, making constant clean, bright contacts.

Clean Easy Feature. The two to eight tubes do not have to be removed and sandpaper used to scrape the socket contacts within the awkward depths of your set. Duo-contacts are easily cleaned and film of oxide between tube and socket, better known as corrosion which can ruin contact, is quickly removed by rotating each tube three or four times. This feature of Na-Ald Sockets saves trouble and time.

Highest Insulating Qualities. Lowest loss and highest insulating qualities are insured in Alden Sockets by using Alden Processed genuine Bakelite.

You can obtain Na-Ald Sockets at radio, electrical and hardware stores. Use them not only in the set you build, but also install them in the set you buy, if not already adopted by the manufacturer. Sockets for all tubes. De Luxe, 75c; others, 35c, 50c, 75c.

Send for free copy of radio booklet—"What to Build."

ALDEN MANUFACTURING COMPANY
Also makers of the famous Na-Ald Dials
Springfield, Mass.



ALDEN MANUFACTURING COMPANY,
Dept. 4-3 Willow Street, Springfield, Mass.
Please send free copy of booklet "What to Build," showing tested and selected circuits.

Name
Address
City State

For The Advanced Student

THE author of this article is the designer of the three-circuit tuner shown on Pages 26 and 27 of this issue.

Mr. Robinson is a graduate electrical engineer and has specialized in investigations leading to low-loss design. I hope to have him write for me, from time to time, articles of this nature, which will give the advanced student the reasons behind the modern trend in the design of radio apparatus.

H. M. N.

THE WHY OF "LOW LOSS" DESIGN

By W. P. ROBINSON

AFTER wandering several years through a maze of radio circuits, including "dynes," "flexes" and "supers," it has slowly become the writer's opinion that the most consistent long-distance reception is to be had using the simple three-circuit regenerative circuit of Major Armstrong.

The legal battle now on between the leaders of the radio industry for control of the patent on the regenerative circuit is evidence that it is considered of tremendous value to the future of radio.

During the past year the science of "low-loss" design has made wonderful strides. It is the aim of the "low-loss" designer to bring the minute currents received from the antenna to the grid of the detector tube without waste and leakage. These currents have strange ways of losing themselves on the way and, until recently, the full advantage of regeneration has never been realized.

We have always been told that regeneration reduces the apparent resistance of a receiver. When the natural resistance of a receiver and the other signal losses are reduced to a minimum then regeneration produces sensitivity and volume little short of miraculous. Resistance losses have been purposely and necessarily introduced in multitube radio-frequency receivers to prevent oscillation and squealing. Potentiometers, positive grid returns and few-turn coupling coil primaries are all means of preventing self-oscillation in multitube receivers, and do so by reducing the efficiency of the tube action. On account of these losses, three tubes often do the work which one tube will do in a real "low-loss" circuit.

The tire advertisement, "Most Miles per Dollar," is the slogan for many of us. We also want other good qualities in our radio receiver, but the man who builds his own and especially the novice, can not usually afford to buy a hundred dollars' worth of parts to build a radio set. A regenerative receiver can be built at a much lower cost than any other set of equal sensitivity. Since it costs little more to build the best possible receiver using "low-loss" methods, the following practical suggestions with the "reasons why" are offered the reader.

Let us summarize the advantages of the three-circuit regenerative receiver built on the "low-loss" plan. They are:

1—Selectivity: This is the ability to prevent "crosstalk" between stations and to bring in distant stations while locals are operating.

2—Volume: Which can be obtained in the output of a receiver only if losses are low and the whole set is working at peak efficiency.

3—Distance (DX): The same conditions which produce volume usually give sensitivity. The infinitely weak impulses from distant stations must not be lost by dielectric absorption or eddy current losses or bypassed by the distributed capacity of the coils. They must be concentrated at one point on the dial to be heard at all.

4—Clarity: After all is said and done, this point is the most important. Clarity means absence of distortion. Reflex circuits sometimes lack clarity because they are so choked with bypass condensers that both the upper and lower bands of audible frequencies (or notes) are lost entirely. Multitube receivers accumulate and multiply tube and battery noises. Our simple one-tube receiver has but one bypass condenser of small value. Regeneration itself produces a lower pitch than amplification circuits, and this lower pitch seems to harmonize with head phones and loud speakers to perfection. Regenerative distortion, or "too much tickle" should never occur in a "low-loss" low-resistance receiver.

"Low-loss" condensers have had lots of publicity this year. Their popularity is well merited. A good condenser has metal end plates, electrically connected with the rotary plates. The stationary plates, which are always to be connected to the grid end of the secondary coil, are supported by transverse strips of bakelite or hard rubber. The efficiency lies in the fact that all dielectrics (hard rubber, etc.) when in the electrostatic field of radio-frequency current, absorb energy in the form of heat and raise the effective resistance of the circuit. The resistance of a good low-loss condenser of .0006 capacity at 300 meters is usually .9 ohm while that of an "old-timer" with composition end-plates may be 5 ohms. A general increase in efficiency of condensers of 100% has been effected during the past year.

The size of tuning condenser is a compromise between various limiting factors. The proportion of inductance and capacity in a tuning circuit is called its "L C" value. This is the ratio of the number of turns, diameter and length of the secondary coil and the size of the condenser used to tune it. Now the greater the proportion of inductance, the greater the voltage across the coil and the louder the signals but the higher the effective resistance of the tuned circuit. This causes the circuit to tune broadly. Our set will not be selective with too much inductance.

The best compromise between selectivity and volume appears to be a .0005 mid. condenser with inductance just sufficient to permit tuning in 550 meters with full capacity of the condenser. We can now tune down as low as the minimum value of the condenser will allow—usually about 200 meters.

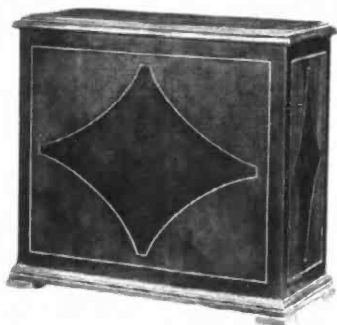
A mechanical vernier device is necessary on the tuning condenser as distant stations require a hairbreadth adjustment. The vernier dials are good but the cam operated verniers mounted just behind the panel and operated by a separate small knob have always appealed to the writer and are inexpensive.

When we come to efficiency in the coil or tuning unit we find difficulty. Coils have, for years, been wound on rubber, fiber, and bakelite tubes, with the turns touching each other, each

RADIO'S LATEST INNOVATION

THE KELLOGG TRANS-B-FORMER

For better operation of radio receiving sets developed, perfected and guaranteed by the Kellogg Switchboard & Supply Company



The Kellogg Trans-B-former furnishes the necessary plate voltages for your radio set, from you 110AC, 60 cycle, electric light socket, without any interference of any kind.

This unvarying current is furnished at less than one-fifth cent per hour. Throw away your "B" batteries and install a Trans-B-former and your set will operate at maximum efficiency constantly.

The Kellogg Trans-B-former will:

- Improve reception.*
- Reduce operating cost to a minimum.*
- Add to the appearance of your set.*
- Increase DX possibilities.*

your dealer's, each \$50.00

KELLOGG SWITCHBOARD & SUPPLY COMPANY, 1066 W. ADAMS ST. CHICAGO, ILL.

As Easy as Setting the Hands of a Watch

NEUTRALIZING NOW NO MYSTERY



MAKES PERFECT NEUTRALIZING Easy and Permanent.
Price \$1.00 each.
(Maximum capacity approx. 5 micro microfarads).

Here is relief for the troubled radio fan who has been enduring the tortures of trying to get perfect neutralization.

The Sterling Microcondenser is an amazing little device that enables you to neutralize the most difficult circuits. Reflex, Neutrodyne and others, with unheard of ease. You can see and know just what you are doing. When you have turned the little rotary plate to the desired neutralized position, you stop right there! The job is done! If your set is properly designed, neutralization formerly the most difficult becomes the easiest task you need to do.

We suggest you try these condensers. If you do, you will gleefully tell everybody how easily the neutralization "bugbear" is overcome. That's what others have done!

Sterling
MICROCONDENSERS

THE STERLING MANUFACTURING CO.
2831-53 Prospect Ave. Cleveland, Ohio

Dept. K



The Super-Amplifier



Condenser Mounting



Grid Leak Mounting



Combination Mounting No. 51



The Resisto-Coupler

The DAVEN SUPER AMPLIFIER

Today, more than ever, the discriminating radio fan is fastening on quality reception—the blarney reception of the past will no longer satisfy. Resistance Coupling is the ultimate method of audio amplification because of its perfect reproduction.

The Daven Super-Amplifier is the aristocrat of all amplification devices—it comes ready to install in any set, condensers and resistors included and the complete unit laboratory tested and ready to give an immediate and superior service. It reproduces with fidelity the voice or musical instruments, as if the radio were not, and that the artists themselves were performing in your own home.

Sold in All Good Radio Stores

DAVEN AMPLIFIER KITS (without sockets and condensers) for those who build their own.
3-Stage \$8.00
4-Stage \$9.50
Manufacturers of the Daven Grid Leak, Resistors and Mountings.

DAVEN RADIO CORP.
"Resistor Specialists"
Newark, N. J.



Read the "RESISTOR MANUAL," a thirty-two page handbook on Resistance-Coupled Amplification with interesting data and book-lets.

Price 25 Cents
At Your Dealers



Model "C"
Cabinet Type
\$30.00

The New Cabinet Model

For those who admire the full, round, musical voice of the Audiophone, but prefer a cabinet design, we have brought out this splendid model.

The case is of real mahogany, of a character to give it equal fellowship with your grand piano. The design goes nicely with the most tasteful furnishings. The size, 17 x 10 x 10 $\frac{1}{4}$, is just right for the top of your phonograph or your receiving set.

It has the sound mechanism of our Model "S," but its square design gives it a sweetness of its own.

NOT A "PHONE UNIT"

The voice of the Audiophone is not a "phone unit." It is a highly developed, electro-magnetic reproducer. This results in an instrument which reproduces with natural quality in most powerful tones, yet has a sensitiveness equal to any loud speaker developed.

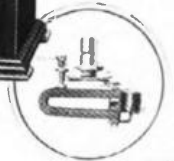
The Bristol line includes five Audiophones priced from \$12.50 to \$30.00. If not at your dealer's, write for Bulletin No. 3022-Q.

THE BRISTOL COMPANY,
WATERBURY, CONN.

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AUDIOPHONE

LOUD SPEAKER



The Voice
of the
Audiophone



Model "S"
Audiophone
\$25.00

Rubber horn 14 $\frac{1}{2}$ inch diameter. Velvet mat finish of mottled bronze and gold; elastic base.

turn forming a miniature condenser with the preceding one. These coils have been plentifully supplied with heavy binding posts and cast metal parts. The wire has been quite small, No. 22 or No. 24, having a high resistance, or the almost equally useless "Litz."

The ideal inductance would have windings of no resistance suspended in free air by silk threads, and with each turn separated from its neighbor to avoid self capacity. We cannot build receivers this way but we can improve matters considerably.

Several patented low-loss tuners have recently appeared which actually have very low losses. One of these tuners embodies several new adjustable features as well as the absolute minimum of radio frequency resistance and dielectric loss, and an analysis of its design will perhaps be of interest to the builder of a low-loss receiver.

A good tuning unit consists of three coils, called primary, secondary and tickler. The primary coil is the antenna-ground circuit and has no metallic connection with the rest of the receiver. The secondary coil is supported between the tickler and the primary coil. It is generally considered the heart of the set and its design has received much attention. The tickler or regeneration coil is rotatable by a dial on the panel and controls the volume and sensitivity of the receiver.

The primary coil has sixteen turns and acts as a coupling coil only, untuned or "aperiodic," collecting signal energy from the antenna. It has been found that no advantage is gained by tuning this antenna circuit. When the primary or antenna circuit is in resonance with the incoming wave it absorbs and re-radiates too much energy from the grid circuit. This absorption is assisted by the high resistance of the antenna and ground (sometimes 10-20 ohms) and results in broad tuning. The primary coil is variable in relation to the grid coil or secondary, so that its influence can be adjusted to just the correct amount. This adjustment is found to depend almost entirely on the antenna length and height and the degree of selectivity required by the location. Hence after finding the correct distance between primary and secondary this adjustment can be left alone. Panel adjustment is unnecessary and undesirable, since changing this coupling alters the tuning dial settings and prevents a correct log of stations being made.

The secondary or grid coil is wound like the primary into a basket-weave, self-supporting unit which is adjustable laterally. It slides on two slender hard rubber rods clamped in a parallel position by the support bracket. The secondary consists of sixty turns of No. 18 wire wound in a basket-weave, self-supporting coil. This seems like a lot of turns for the size of condenser used with this set, but it must be remembered that this form of winding leaves every turn of wire surrounded by air, which has the lowest capacity factor of any insulator. The turns being separated in this way give the coil a very low total distributed capacity, and this requires more turns to make up the total LC value to cover the wave band desired. The diameter of the secondary is kept small to restrict the magnetic field and prevent body capacity.

Extensive research work has been done to determine the most effective size of wire and hundreds of coils have been made and measured for resistance. Too large wire introduces too much metal in the magnetic field, and the resistance rises, due to "eddy-current" losses. Large wire also, tends to increase the capacity because of the large area of turns adjacent. Too small wire raises the resistance as well since we find that

these currents travel on the surface of the wire only. Again a compromise is made and No. 18 wire has been proved the best for this form of winding.

A peculiarity of all radio circuits is that the resistance of a coil is increased by a high resistance circuit being coupled to it. For this reason it is necessary to use a low resistance coil for our tickler, as this rotates in the magnetic field to the secondary. Its diameter must be small in order that its capacity to the secondary will not affect the tuning of the secondary on distant stations.

A tickler feed-back receiver will sometimes fail to regenerate and oscillate when first set up. This failure may be noticeable only on the higher wave lengths, and changes in the adjustments of the set should be made until it can be made to oscillate (squelch) at full condenser setting (high wave length). The correct adjustment should be such that the tickler has to be rotated until its windings are nearly parallel with those of the secondary before the set will oscillate at a wave length over 500 meters. The most sensitive condition is reached just before the squealing point, and the idea is to arrange matter so that several degrees on the tickler dial intervene between these points, thus making a non-critical adjustment. To do this let us consider first the usual causes for nonoscillation or "dead-tickler."

- 1—Too great a distance between tickler and secondary (too loose coupling).
- 2—Too close coupling between primary and secondary (especially when receiving stations close to the natural wave length of the antenna).
- 3—Too low plate voltage (or high resistance in "B" battery circuit).
- 4—Omission, or too small value, of by-pass condenser across phones or transformer. (This can be connected so as to by-pass "B" battery also.)
- 5—Too low value grid leak.
- 6—Excessive radio-frequency losses in tuning condenser, tube socket or other parts used.
- 7—Too much moisture in the set.

Most of these causes of nonoscillation could be avoided by the manufacturer of tuning coils by simply adding a few turns to the tickler winding. However, low-loss designers find that the fewer turns on the tickler the lower its high frequency resistance is, and the less it increases the resistance of the all important secondary or grid coil by its coupling thereto.

Here also comes the advantage of a fully adjustable tuning unit. If a lateral adjustment is provided so that the range of coupling between tickler and secondary can be set exactly to suit the condition present and still maintain the greatest possible distance between them, then maximum efficiency surely is obtained. The annoying detuning effect of changes in the tickler's position is also minimized by this loose coupling and nonradiation actually effected.

We must, at this point, discuss the important little bypass condenser. Many writers have said that this can be left out of regenerative sets as the capacity of the phone cords, and of the transformer primary when amplification was used, was sufficient to by-pass the radio frequency portion of the output.

This idea is a fallacy in a low-loss receiver. By connecting a .001 condenser between the output end of the tickler direct to the filament post of the detector tube the radio-frequency resistance of the tickler and its circuit is greatly reduced. This, as shown above, is very desirable. However, several smaller values of condenser should be tried in an endeavor to secure noncritical tickler adjust-

ment as well as maximum tuning range with one setting of the tickler.

The smaller the value of this condenser the less the effect of the tickler and vice versa. However, greater than .002 should never be used, as the high notes of violin music may be lost.

In this connection, let us mention that the finest vernier effect on regeneration can be secured by shunting a .00025 with a "midget" variable condenser, using the combination as the bypass condenser. It is often surprising how much the grid leak affects a regenerative receiver. Too low a resistance value (also too much leakage in tube socket) will prevent regeneration and cause weak signals. Too high a value causes the tube to block and act intermittently. The correct value allows the tubes to go quietly into oscillation and widens the distance between the points of sensitiveness and oscillation.

The plate voltage used should be that recommended by the tube maker. Usually the "soft" tubes UV-200 and C-300 operate best on from eighteen to twenty volts, while the rest ("hard") tubes, such as WD-11, 12, 199-299, 201A, 301A, DV-2, DV-3, etc. will work well on from twenty to fifty volts.

The grid return or grid bias, an important point usually neglected, is the question of where we shall connect the wire from the filament end of the secondary coil. In amplifier circuits, this is always connected to the negative side of the "A" battery, below the rheostat, to place a strong negative "bias" or voltage on the grid. In detector circuits, using a grid leak and condenser, we find that, when operating the "soft" tubes (200 and 300), a grid return direct to the negative socket terminal will give the best detection. When using "hard" tubes the correct grid return is to the positive socket terminal.

A connection is sometimes made between the "ground" and the "grid return." This is done to eliminate any tendency to body capacity detuning and should be unnecessary in a properly designed set. Volume is somewhat increased, but a great deal of selectivity is lost thereby. It also tends to increase the effect of local electrical disturbances, such as trolley and high tension wires, as well as sixty-cycle hum from lighting wires.

The new low-loss tuners are designed to be mounted at least one and one-half inches away from all other parts and from the panel and baseboard. The tuning condenser should be placed as close to the secondary coil as this limitation will permit, and under no circumstances on the other end of the panel for the sake of symmetry. Leads from the condenser to the secondary should be soldered and run directly "as the crow flies." The grid wire, to the grid leak and condenser on tube socket, should then be firmly soldered at the nearest point. This secondary-condenser-socket circuit is the heart of the set and hearing that station 1600 miles away may depend on eliminating one small loss in it.

You will note that the best low-loss coils are self-supporting and have absolutely no "dope" or varnish on them. Do not varnish them. It will mean broad tuning and weak signals. Low-loss design is calculated to concentrate all the signal strength in the antenna at one sharp point on the dial. This is done by reducing the amount of energy absorbing solid insulation, replacing it with air, the perfect dielectric. Varnish doubles the losses and resistance and further increases the distributed capacity of a coil.

Build a low-loss receiver and make it "percolate." You will be well repaid for your trouble. Why use eight tubes if you can do it with three?

W O R K R I T E R A D I O S E T S W O R K R I G H T



Select any station that's on the air!

You never imagined that radio could be so sure—so simple to use. Just think! Once you're tuned in a station with Workrite Super Neutrodyne Receivers, you can turn to it instantly, at any time, simply by referring to your "log."

Select what you want to hear from the daily programs—and know in advance that Workrite will get it for you—clear as a bell, with no loss of quality, richness or brilliance, and free from distracting howls or whistles.

Workrite brings in distant stations—not just more in a while—but regularly and distinctly on the loud speaker. Under favorable conditions it will bring in broadcasting from across the continent.

Amazing Selectivity

There's another great Workrite advantage that you'll appreciate. It's this. No matter how powerful your local stations may be, you can easily tune them out and bring in other stations using practically the same wavelength.

The first time you use one of these beautiful, compensable sets, you'll

think it's almost magical. But, there's really no secret to Workrite's remarkable range and selectivity. They are due largely to two things. First—Workrite's ingenious Super Neutrodyne "tune-up." Second—the way Workrite is built—the fine materials that go into every set—the ultimate, careful attention given to every detail of manufacture.

Already Tremendously Successful

Workrite has already won a host of enthusiastic friends. Dealers in many cities had themselves pressed to meet the demand for Workrite. So, if the store you visit is unable to demonstrate Workrite for you, write us and we will send you the name of a store that can. Or, if you want to know more about Workrite sets before you see them, mail the coupon below and we will send you a beautifully illustrated rotogravure folder giving full information on all Workrite models.

By all means, know what Workrite will do. It would mean so much to you and your family—a new delight, a fresh treat, every day.



WORKRITE AIR MASTER
A 2-tube Neutrodyne Set

Encased in genuine hawthorn mahogany cabinet with graceful slung panel. Almost identical with Workrite Radio King, shown in main illustration, except the latter has a loud speaker built into cabinet.

Prices:
Air Master, without accessories, \$20
Radio King, without accessories, \$25

WORKRITE CHUM
A 2-tube Neutrodyne Set

Similar to Air Master in appearance. Equipped with 4 tube sets in performance. Cabinet provides space for both A and B batteries.

Price, without accessories, \$75

THE WORKRITE MANUFACTURING CO.
1808 EAST 30TH STREET
CLEVELAND, OHIO
Branches: Chicago, 536 Lake Shore Drive; Los Angeles, 238 South Los Angeles Street

DEALERS—If you don't know about Workrite Super Neutrodyne Receivers, by all means write us immediately for full particulars.

WORKRITE

SUPER NEUTRODYNE RADIO SETS

SUPER-HETERODYNE

Many people write us to ask us why we don't print the hook-up for a good super-heterodyne. The answer is easy. In our issue of March, 1924, we gave full details for building a super-heterodyne which gives the best quality of any we have used. We have not since run across a super that was any better.

Are You a "Super-Fan"?

Then get this article and build the set. It's just as good today as the day we printed it.

Full Details. Photographs of Layout. "Picture" Diagram.
Complete Instructions. Schematic Diagram.

Everything complete so that even a novice can build it.

Send 10 cents for the March, 1924, issue to

Circulation Department RADIO IN THE HOME 608 Chestnut St., Philadelphia

WORKRITE ARISTOCRAT

A 2-tube Neutrodyne Set in this beautiful mahogany console, the loud speaker is placed on one side and compartment for A and B batteries on other side. All connections made inside each cabinet and plug. A set unenclosed in any respect. Price, without accessories, \$150



Send Coupon for FREE Rotogravure Booklet

The Workrite Manufacturing Co.
1808 East 30th Street Cleveland, Ohio
Please send me FREE a copy of the Rotogravure booklet which describes Workrite
Name
Address
City State



Engineers developed this special panel material for radio ONLY

THERE is nothing quite like Radion—"the supreme insulation"—for real results. Authoritative laboratory tests conclusively prove highest insulating characteristics. In the set you build, it may give you just that extra energy needed to tune in a distant station. When you see Radion in a ready-built set, it is usually an evidence of general good quality in that set.

You can see the difference between Radion and common panel materials, if you will look at the finish. Radion has a high, polished finish. That keeps out dirt and moisture, which even in little particles on the surface sometimes cause short circuits and reduce good reception. Look at Radion and other panels under a magnifying glass if you can.

Everyone knows Radion is an easy panel material to drill, cut and saw. There are eighteen stock sizes, two colors, black and mahogany. Sold universally by dealers who know radio. Better performance will make it worth your while to ask for it by name, and to look for the name on the envelope, and the stamp on the panel.

Radion dials to match, also sockets, binding post panels, insulators, knobs and new Radion built-in horns.

Send for Booklet

MAIL coupon below for our catalog and booklet, "Some Insulation Stickers Explained."

AMERICAN HARD RUBBER COMPANY
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Chicago Office: Conway Building

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RADION

The Supreme Insulation

PANELS

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AMERICAN HARD RUBBER COMPANY	RM-12
11 Mercer St. New York City.	
Please send me your catalog and booklet, "Some Insulation Stickers Explained."	
Name	
Address	
City..... State.....	

Angelus Temple Is Unique Among Broadcasters

(Continued From Page 23)

are broadcast a special Sunshine Hour service which is radioland's very own. Then there are the regular church programs twice on Sunday and on evenings with the Temple always crowded and with thousands of radio church members listening in. It not infrequently happens that there is such a struggling mass of humanity packed outside the church doors that the church is quickly emptied at the close of service, and the waiting crowds hidden to enter and a second service starts.

And this spirit of unselfish devotion on the part of workers and audience carries on the radio work in similar manner as the building program and services. The initial cost of the station—some \$25,000—was received from voluntary contributions. So also is the cost of upkeep. Every day in the year a new patron of the radio church steps forward and pays the

Park has been going more than three years and is just getting a start. There was a time when the whole family rode in the buggy to the four corners church and stayed all day with lunch on the lawn at noon time. Nowadays the Four Square Gospel Church members motor to the morning services, which are closed by Sister McPherson saying, "Now all you good people go over to the Park, eat your lunch and be back here by 2 o'clock."

At two o'clock they are there. And hundreds of others too. Whole families stay all day for the two services and also for the evening sermon. Babies in arms are doubly welcomed, and for mothers a special section is reserved. Instead of parking the youngsters in a stuffy nursery they go right into the church and get the best seats.

This wonder woman, who is the guiding genius behind the whole movement, Almee Semple McPherson, has conducted many successful revivals in the United States, Canada, England and Australia. For many years she was a missionary in China. Now she preaches the word of God in the Temple, over radio and through the printed word in her magazine, "The Bridal Call Four Square."

This great religious mill knows no hours. Its religious talks are worthy of preservation and many of them are in permanent form in a volume, "This is That." The Temple musical activities are all embracing. They include the splendid Temple Silver Band of forty musicians and the Temple Choir of more than a hundred people. During the two weeks' Munhall revival a special choir of 1000 voices provided inspiration for every one. This old-time Methodist preacher, 84 years young, journeyed from Philadelphia to Los Angeles and did a splendid work. Besides the Los Angeles revivals he made three weeks' circuit of the branch churches in foothill towns and seashore cities.

Among the unusual musical programs has been a harp ensemble of fifty instruments, with the gentle, soul-like strains of inspirational music doing as much as any sermon to win converts for the cause.

Go, if you can, to the Temple at any of its services. Perhaps you'd like Thursday nights when an average of 100 people are baptized. Or maybe Wednesdays with the testimonials. It makes no difference when you go. You will always find crowds waiting outside.

So this great Cathedral of the Air, via radio, came into being. It reaches thousands who could not get to the Temple if they would because of distance or infirmities. It also reaches those who cannot gain entrance, because no matter how large the structure becomes it can never adequately accommodate all those who wish to enter.

Evangelist Sister McPherson and her ready helper, Mother Kennedy, are pioneering in radio church activities. Radio has saved thousands of lives on the seven seas when ships in distress have flashed the fateful S O S. The call has always found a quick and willing response, for human lives were at stake.

And now millions of distressed human souls, through radio, are finding an answering message of courage, hope, comfort and joy. And though it is the sweet voice of a woman which is carried by the speeding ether waves, the message is the Word of God.



K. G. Armistead, broadcast supervisor of KFSG, Los Angeles

maintenance of the day. What more evidence can you desire of the fulfillment of a crying need in spiritual development? Not only has this been going on the past year, but already patrons are booked many months ahead to stands as sponsor of radio for a single day.

So this church that is never closed, with a radio that is seldom silent, continues to find new and novel channels for its activities. Vesper organ recitals, midnight musical programs, midday programs for shut-ins, sometimes a special midnight service especially for missionaries in far distant lands—all of these are but milestones for a congregation and a pastor that follow no beaten paths, but blaze trails of their own.

And the radio Bible class has become a natural adjunct to the radio services of KFSG. So many could not attend the church services, the Sunday School classes or the resident Bible school and today the radio Bible class—with lectures, printed outlines of courses and other necessary material—has become an indispensable part of Mrs. McPherson's activities.

It is small wonder that the Temple has a church membership of nearly 8000, a Sunday School attendance of more than 2000 and a radio church audience and membership that cannot be estimated. Branches in more than a dozen cities, a flourishing missionary Bible training school, numbers of representatives in foreign missionary channels—these are but high lights in the tremendous and energetic activities of the congregation of the Four Square Gospel.

Old-time Methodist revivals used to last a few weeks. This one at Echo

Flewelling's Circuit

(Continued From Page 14)

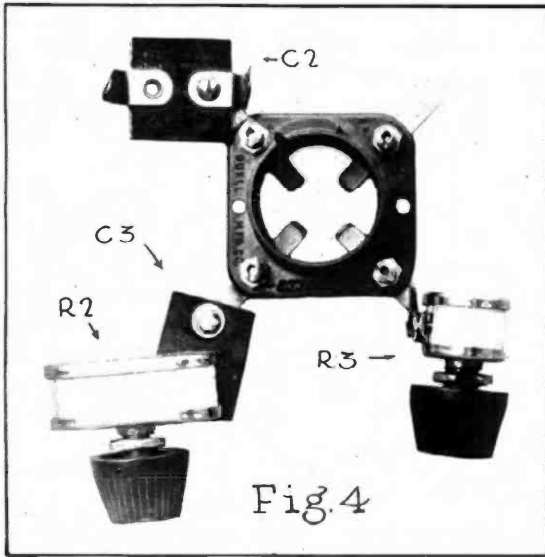


Fig. 4

The condensers and leaks can be mounted directly on the socket extensions

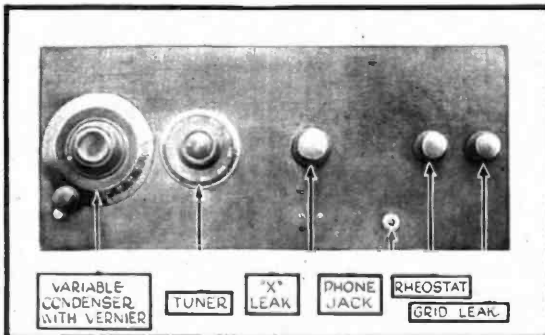
louder than the incoming static noises, then we can receive such a signal no matter how far away from us it started.

Will those among my readers who are interested please note that this same thing also applies, and is true in the case of the one-tube regenerative receiver? A one-tube regenerative receiver will get the same distant signal that the "Super, Last Word-Dyne" will, the difference being that the one-

tube set needs a larger antenna and, of course, lacks the volume of the larger set.

Take unto thyself the following list of materials and see for thyself:

- 1 Formica or hard rubber panel, 16" x 7".
- 1 Eleven-plate variable condenser.
- 1 Flewelling tuner with fifty-turn tuning coil and fifty-turn tickler coil.
- 1 Standard socket.



The front panel layout. This is the Flewelling circuit as we made it at Station 3XP, with all parts separated as shown in the 3XP-Style Wire-Ups, on Page 14. The panel measures 7 x 16 inches, so, with a pair of dividers, or a ruler, you can easily figure out the distances for yourself. They aren't important anyway



SWEET THE AIR With Air-Way

No matter how modest the ideas of the radio beginner, he soon begins to search for distant stations.

Then is when he appreciates the AIR-WAY Receiver.

All distant signals come to any set, but they will not fight their way in through unnecessary losses and high resistances.

AIR-WAY Receivers are the last word in LOW-LOSS construction and tuned radio-frequency amplification and build up the weakest signals to pleasing audibility.

Oscillation is perfectly controlled and all extraneous noises eliminated without neutralizers or complicated adjustments.

Air-Way No. 41.

(FOUR TUBE)

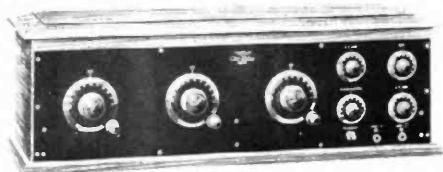


We claim without reservation that AIR-WAY Model 41 is superior in every quality of radio reception to any other four-tube set ever built, and unequaled by any set at less than nearly twice the price.

The selective qualities are unexcelled in any set, operating on an outside aerial.

The dignified design of the solid walnut case and the workmanship and finish of the panel equipment give it an outward appearance in keeping with the operative quality.

A set that meets all market conditions and all individual requirements; one that the dealer may sell to the inexperienced user or the most discriminating expert and be sure that either will attain results satisfactory in every way.



Model-51.

The latest development in tuned radio frequency with two stages of radio-frequency amplification, detector and two stages transformer coupled audio-frequency amplification.

Offered without reservation as a set that will give general satisfaction to all broadcast listeners regardless of previous radio experience.

Price, as illustrated, \$125.00.

Also furnished in handsome Console-type cabinet of solid walnut. Price \$375.00.

AIR-WAY Apparatus is the result of several years study and development by skilled radio engineers and is strictly up to the minute in radio design.

Operation is simplified to the limits of the radio novice, and quality throughout is developed to meet the demands of the most discriminating of radio experts.

AIR-WAY Apparatus is distributed through established Jobbers and Dealers only. Write our Sales Department for catalog of the complete line.

Manufactured by
**AIR-WAY ELECTRIC
APPLIANCE CORP.**
Toledo, Ohio

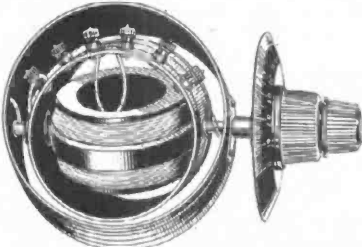
Sales Department
THE ZINKE COMPANY
1323 S. Michigan Ave.,
Chicago, Ill.

COAST COIL

The Only Coil With A Double Rotor

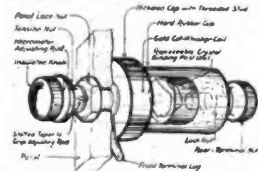
WHEN you buy a three circuit tuner you want to be sure that it will give you the following:—Distance with local stations going full blast—maximum volume without distortion—coast to coast reception! Under favorable conditions, you get all these with the Coast Coil.

It's the double rotor principle that proves the superiority of the Coast Coil. The primary winding on the inner rotor affords the maximum coupling required. The plate circuit coil on the outer rotor is spaced far enough from the Secondary winding on the stator to prevent distortion.



The Coast Coil is the best tuner for YOUR aerial and YOUR set. You take no chances when you use a Coast Coil. Moderately priced—\$7 complete with special bakelite vernier dial. Bakelite insulator. For sale by radio dealers. If your dealer doesn't have a Coast Coil order from us giving your dealer's name and address.

The VARIOTECTOR



Best for REFLEX

Study the descriptive phantom view of the Variotector opposite. Notice point for point the superiority of the

Variotector. For reflex or straight crystal circuit, no crystal detector equals the Variotector. No chance of electrical leakage or short circuiting. The Variotector mounts right on the panel and is either fixed or fixable. You'll get the most volume, with the greatest clarity and distance when you use a Variotector.

Complete for \$1.50 at Dealers

If your dealer doesn't have a Variotector, order direct giving your dealer's name and address.

CRYSTALS: Foote Crystals are famous from coast to coast for their extra loudness. Each triple tested for triple life—triple aim—triple power. Eight different mounts—30 cents to \$1.00.

FOOTE

RADIO CORP.

104 North 19th St., Philadelphia

- 1 Rheostat.
- 2 Bradyleaks.
- 1 Phone jack single circuit.
- 1 Dubilier micaion condenser of .005 mf. capacity.
- 3 Same of .006 mf. capacity.
- 1 16" x 7" sheet of copper foil.
- 1 Sub baseboard, 16" x 6".
- 1 3" dial for condenser.
- 4 6-32 brass machine screws and nuts.
- 3 Binding posts.
- 1 Mounting strip for binding posts.

If any change in above list of parts is necessary, try to keep as near as possible to the type specified.

You should never use larger than an eleven-plate condenser for broadcast reception and for this circuit you will find that handling eleven plates will take up all your spare time without bothering with twelve more of them.

Fig. 1 shows the original three-bank condenser type of Flewelling circuit that has worn so well. Fig. 2 gives the single condenser successor, Fig. 3 shows the latest modifications which undoubtedly remove most of the uncertainty from the circuit giving a high resistance leak—the "X" leak—back onto the grid from the plate. This is the circuit we are going to build in this article.

All these types embody the idea of blocking the grid of the tube by the .006 mf. condenser C3, and the extra feed-back from the plate circuit known as the "X" lead, but in Fig. 3 we get the smoothest and most con-

sure there is no contact between them. Test each piece with a battery and phones as you install it to be sure on this point.

In our published wire-ups, however, it is usually necessary for us to separate parts more than they would be separated in the actual building of the set. This is because if we showed them as they are actually put on the panel, the wires would be all bunched together and you would not be able to tell one from the other.

In last month's issue of *Radio in the Home* I gave the diagram for this set and showed the grid leak directly across the grid condenser. Since then, I have been making more experiments and I think it better to put the grid leak as I have it in this number—that is directly from the grid connection on the socket to the positive filament connection on the socket.

I will give the usual "check-up" lists for these diagrams at the end of this article, but first I want to say something about the operation of the receiver.

Operation of the set is simple. Do not connect to any antenna or ground until you are accustomed to the operation and then use only a very small antenna, such as fifteen or twenty feet of wire, a loop, even a curtain rod or bed spring.

As the tickler coil is turned you should hear a whistle or howl. If not, simply reverse the tickler coil connections and then adjust the grid leak and position of tickler coil very



E. T. Flewelling, associate editor of "Radio in the Home," explains his new circuit to Merrill Neely, laboratory assistant at Station 5XP, our experimental station at Delanco, N. J.

sistent control, although the "X" leak R2 is almost unnecessary.

Extension of the socket terminals in the standard Flewelling socket makes it particularly easy to combine the parts with a minimum chance for wrong connections. The grid condenser C2, the blocking condenser C3, the "X" leak, R2 and the rheostat, R3, mount directly on the socket extension arms as shown in Fig. 4, thus greatly helping us in our task of wiring. Radio sets should be "built," you know, not tied together with a bunch of hay wire.

Figs. 5 and 6 show photographic diagrams of the set with the parts arranged in their logically progressive positions.

But first you must prepare your panel and shield it.

Clamp the copper shield and the panel together and drill both pieces at once to insure correct line-up, and then slightly enlarge holes in the copper sheet for the grid leaks, variable condenser and phone jack. Do not let these four parts make electrical contact with the copper. We are not going to ground the copper shield as is usually done. Place a piece of cardboard, rubber or mica between the shield and parts so that you are

carefully to the point that clears up the whistle. Operation beyond this point is the same as any other receiver. It is simply a matter of personal taste as to how you handle the set. A hard tube, short antenna, slow operation of the controls, much patience and the knowledge that thousands of folks are successfully operating this most sensitive receiver; these are the things required in the operation of the Flewelling circuit.

There are one or two characteristics found in the circuit that it would be of assistance for you to know about. For instance, we have a typical "rushing" sound, which has been referred to by some of my friends as a ton of coal being dumped into a cellar. This sound is typically characteristic of the Flewelling circuit and it is also an excellent means of judging how the circuit is operating.

If you hear no rushing sound you may be sure that the circuit is not operating as a strictly "super" circuit, and if you do hear it, its volume is a measurement of the manner in which the set is operated. Invariably, the louder the rushing sound the better amplification you will get on the incoming signals.

Another point about this rushing

sound that is likely to be confusing also, is that it is dependent on the "polarity" of the tickler coil. You may find that it is necessary to reverse the leads on the tickler coil or reverse the coil itself in the Flewelling tuner to make it easier to get the rushing sound throughout the range of the condenser. A peculiar thing is that you will get the rushing sound on certain settings of the condenser no matter which way the tickler coil is placed, and you will be able to tell which is a correct adjustment or correct setting by the range on which you can get the rushing sound. You should be able to get it from the start of the condenser up to the full maximum setting.

The typical whistle of this super circuit is also present and you will adjust the intensity of this by the knobs on the two grid leaks, R1 and R2, until you are accustomed to adjusting to a local station. This whistle is a nuisance, it is to be granted, and is one of the principal reasons why super-regeneration has never come into its own. It has seemed, so far, to be absolutely impossible to remove the whistle from the set and, due to the electrical characteristics of the whistle, it means absolute failure so far as amplification of the received signal is concerned. When you start to amplify you also amplify the whistle and an amplified super whistle is guaranteed to drive any one from the house.

Very persistent work has been done by various engineers interested in super-regeneration to remove the whistle and still maintain the excellent amplifying qualities of a super circuit. We have seen some little progress along this line ourselves, and it is one reason why we have used a copper shield in this set. As I said before we do not care to make any promise at this time, but we have ourselves succeeded in removing the whistle, and it is only a matter of further tests to ascertain whether we have removed the whistle without serious impairment of the incoming signals.

The circuit as it is presented to you in this article is laid out in such a manner that any further developments will not affect the circuit and the present layout so that you will be able to go on directly with the set that you have made. It is not necessary further to describe the action of the circuit because I have so many times insisted upon slowness and patience in its operation.

These are really the outermost issues of the operation and one can only succeed in operating the circuit correctly by the use of these virtues. If you do not, however, care for the whistle in the circuit, you will find that by turning the tickler coil farther away from the set and possibly by removing a few turns on the coil, you will be able to operate it as a straight regenerative circuit of real sensitivity.

And now for the check-up lists for our photographic wire-ups:

Figure 5

From plus A binding post on binding post block to one side of rheostat.

From the other side of the rheostat to the positive filament connection on the tube socket.

From negative A binding post on the binding post strip to negative connection on socket.

From positive B binding post on binding post strip to the frame connection of the phone jack.

The negative B battery does not come into the set at all although it can be brought to the middle binding post if you so desire. However, you can simply run a wire from your negative B battery directly to the positive A battery if it is more convenient. The B battery voltage for this set should be about 50 volts.

The next wire goes from the spring

of the jack to one connection of the tickler coil.

From the other connection of the tickler coil of the tuner a wire goes directly to the plate binding post of the socket.

Figure 6

Connect a wire from the frame of the jack to one side of the .006 phone condenser mounted on the panel and connect another wire from the other side of that phone condenser to the spring of the jack. This places the .006 phone condenser "across" the jack.

A wire goes from the stationary plates of the variable condenser to the left hand side of the grid condenser which is mounted on the socket.

Another wire goes from that same side of the grid condenser to one terminal of the fixed coil on the tuner.

A wire goes from the rotor plates of the variable condenser to the other connection of the fixed coil on the tuner.

A wire goes from that same connection of the fixed coil on the tuner to the left-hand connection of the fixed condenser which is on the negative terminal of the tube socket.

Connect the grid terminal of the tube socket to one side of the grid leak R1.

Connect the other side of the grid leak R1 to the positive terminal of the socket.

We now connect the "X" leak R2, and this requires care. One side of it—the right-hand side as you look at it in the diagram—is wired directly down to the fixed condenser which is on the positive terminal of the socket. The other side is wired over to one of the connections on the tickler coil of the tuner. This particular connection is of extreme importance. You already have one connection going to the plate of the socket. The connection you are now making must go to the other one. It is extremely important that you do not make the connection to the same point as is already connected to the plate. In other words, the current must go from the plate of the socket, through the coil and then to the "X" leak.

Editorially Speaking

(Continued From Page 8)

ments, please believe me when I say that it is not because we don't want to, but simply because we are human beings and can do only so much work in a day. We will add to our staff as the necessity arises providing we can find the caliber of men that we want. Under no conditions will we add men of less ability merely to get letters out of the road in a perfunctory manner. When we answer your letters we are going to give you the information that you want and we are going to see that it is given by men whose knowledge is backed by all of the guarantee that this magazine can give.

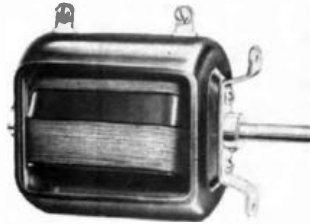
We must ask you, though, to cooperate with us to a certain extent. You would be surprised if you knew what a mass of mail comes in here asking questions which have been fully answered in the magazine. Before you write us, won't you please read the magazine very, very thoroughly and be sure that the information you want is not given in the articles? If the question concerns such a matter as the inverse duplex system, it seems to me that we might at least ask you to buy the back issues of the magazine dealing with the system so that you can see from them whether your question to us is really necessary. I think in 99 per cent of the cases you will find that one of the articles by Mr. Grimes will give you any information you may want on his entire system. The same applies to Mr. Harkness and Mr. Flewelling and to all of our

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other writers. We can supply all back issues at ten cents each, with the exception of last December and January. These are now absolutely out of print and we cannot get any more of them.

So come along with your questions and don't feel that you are imposing on us. Ask us what you want to know whether you subscribe for the magazine or not and I don't want you to feel that that is essential when you write to me. I'm here for that purpose and I'll handle the job just as long as I can, and when it gets too big for me I'll yell for help and let you know.

There is one other stipulation which I must make in this connection. That is, under no conditions whatever, can we permit sets to be brought or sent to Station 3XP. A great many readers have either sent their sets to us by express or have brought them out to Delanco expecting us to look over them and see what is the matter with them.

Now, while we would be very glad to do this if it did not interfere with business, I cannot look upon such practice as anything but an unwarranted imposition upon the staff of Station 3XP and upon the other readers of this magazine.

You who buy this magazine or subscribe to it do so with the expectation and, indeed, with the promise from us that we will continually develop radio to better and better efficiency, and, for this purpose we maintain our laboratory and the staff which works there. If then, John Jones, having failed to make one of our hook-ups work, brings it or sends it to Station 3XP, he is attempting to compel us to give his individual case the time and the effort which you are paying for for entirely different purposes. It is not fair to you.

In other words, the laboratory at Delanco is maintained for the greatest good to the greatest number; no individual has any right to demand any of that time for the correction of his own shortcomings. I think you will agree that this is the only fair rule that we can make, and that it is made not from a selfish purpose nor from any desire to avoid work, but for the larger purpose of devoting our entire laboratory facilities to the advancement of radio as represented in this magazine.

There is just one other matter which I would like to call to your attention, and that is the extreme importance of printing your name and address on your letters. Your signature may

be a very artistic thing and have taken you years to develop, but we so frequently find it utterly impossible to interpret the signature to letters.

WSAI Ready for Super-Power

(Continued From Page 18)

concerts are presented at 7:30 on Tuesday evenings, 8 o'clock on Saturday and aspecial sacred chime concert is offered on Sunday afternoons at 3 o'clock.

WSAI endeavors to satisfy those of its fans who are inclined toward sports and regularly presents the principal local sports events. This station has the distinction of having put out the first night football game ever broadcast, and the resultant thousands of reports indicated that there is a large following for this line in the United States.

Regular programs are offered on Monday, 10-12 P. M.; Tuesday, 7-10 P. M.; Thursday, 10-12 P. M.; Saturday, 8-10 P. M. and at midnight, and Sunday, 3-4 P. M.

The staff of the station has often been asked, as has been the similar experience of other broadcasters, to explain the value of a broadcasting station to the United States Playing Card Company. They answer that it is an attempt to build good will through the medium of the air, but we believe that this progressive organization is moved in a large measure by civic pride to spread the name of the Queen City to the far corners of the world.

The Counterflex Simplified

(Continued From Page 20)

gested a method of testing the efficiency of a Counterflex receiver and also gave some operating hints. For the benefit of those who were unable to buy the October number I will repeat the substance of my suggestion, with slight variations as they have occurred to me since:

There is a simple and infallible test for determining whether your Counterflex receiver is operating with maximum efficiency. Be sure to make this test and correct any mistakes it reveals before calling your set "perfect."

To make this test choose a time when local stations are not broadcasting. Connect your antenna, ground and batteries and plug in your loud speaker. Turn the Counterdon to its minimum position (rotor plates out).

When the secondaries of the

New York City Leads With Twelve Stations

New York City has the largest number of broadcasting stations, with a total of twelve, records of the Department of Commerce show. Philadelphia is second with eleven stations and Los Angeles third with ten stations. Here are the number of stations for the principal cities of the country divided into classes:

City	Class A	Class B	Class C	Total
New York	3	7	2	12
Philadelphia	4	4	3	11
Los Angeles	5	3	2	10
Chicago	4	4	2	8
Seattle	5	1	2	8
St. Louis	5	1	2	8
New Orleans	8	0	0	8
Denver	7	0	0	7
Minneapolis	4	1	0	5
Cincinnati	1	3	1	5
Cleveland	2	2	0	4
Pittsburgh	2	2	0	4
Salt Lake City	3	0	1	4
Boston	2	1	0	4
San Francisco	2	1	1	4
Washington, D. C.	2	2	0	4
Detroit	1	2	0	3
Kansas City	2	1	0	3
Springfield, Mass.	0	1	0	1



Prof. Walter Sylvester Hertzog, of Hollywood High School, who broadcasts a nightly fifteen-minute story of American History over KHJ

Counterformers are tuned to the same frequency, a howl should be heard in the loud speaker, no matter to what frequency both circuits are tuned. For instance, a howl should be heard when the two tuning dials are turned so that both circuits are tuned to, say, 270 meters; similarly, a howl should be heard when the two tuning dials are turned so that both circuits are tuned to, say, 550 meters.

Furthermore, it should be possible completely to eliminate this howl by increasing the capacity of the Counterterdon, no matter what frequency the two circuits may be tuned to.

If your set fulfills the above conditions it would appear to be operating at maximum efficiency.

You may find, however, that:

(1) While you are able to stop howling at all frequencies by turning the Counterterdon, the receiver does not howl at all at some frequencies.

Or you may find that:

(2) While the receiver howls at all frequencies, you are unable to stop the howls with the Counterterdon at some frequencies.

Either condition may be caused by the resistance or length of your aerial. The resistance of your aerial (caused by its length or other causes) may be increased by increasing the resistance of the grid circuit sufficiently to damp out self-

"Uncle John" the Sandman and Little Queen Titania

(Continued From Page 29)

friendly voice say "KHJ, the Times, LOS (with a long O) Angeles, Calif." —you will agree with me that the spirit is radiated to every far corner.

oscillation at some frequencies. The condition can be remedied by either decreasing the resistance of the antenna (usually by reducing its length) or by decreasing the resistance of the grid circuit, which can be accomplished by increasing the capacity of the fixed condenser across the secondary of the reflex transformer. If your aerial is the correct length, it should not be altered; the capacity of the fixed condenser should rather be changed.

While on the subject of aerials, I will explain what I mean by "correct length." The correct length of aerial is the length which gives the best selectivity consistent with good audibility. Up to about 125 feet (horizontal and vertical measurements included) the audibility of this receiver, or any other similar receiver, increases as the height of the aerial increases and the selectivity decreases



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to the same extent. There is no direct proportion, of course, between the height of the aerial and the audibility or selectivity, but, generally speaking, a long, high aerial gives to the receiving set more audibility and less selectivity than a low, short aerial. Some receivers are so selective in themselves that they can efficiently be used, even in areas crowded with high power broadcasting stations, with a high, long aerial. Such a receiver, however, would of necessity have more than two tuning controls and would probably be more expensive than the Counterflex. The selectivity of the Counterflex is sufficiently good for general purposes.

It would be a mistake, however, to use the Counterflex with a long, high aerial in a district surrounded by broadcasting stations. Such an aerial could probably be however, if there are no nearby stations. The "correct length" of aerial, then, depends upon your location. If you live in a city, surrounded by broadcasting stations, it is sometimes a good idea to have two aerials, a low short aerial, or indoor antenna, for increasing the selectivity when receiving distant stations through locals, or for separating locals from each other, and a high, long antenna for distant reception when the locals are not operating.

To get back to my subject, however, I repeat that, if your aerial is the correct length and you cannot make your receiver howl at certain frequencies the resistance of the grid or plate circuits must be decreased—usually by increasing the capacity of the fixed condenser across the reflex transformer.

You will notice I say "grid or plate circuits," because the condition outlined may be caused by resistance in the circuits other than that caused by the antenna. If you are using some make of condenser or audio transformer other than that specified the resistance may be higher.

If the second condition outlined above exists, that is to say, if you find you are unable to stop howling at certain frequencies by turning the Counterflex, the cause may be the low resistance of your antenna or "parasitic" coupling between the plate and grid circuits of the reflex tube. Once again, if your antenna is the "correct length," do not change it, but look for the trouble in the wiring, arrangement of the apparatus, position of the transformers, or other sources of inductive or capacitive coupling which are causing self-oscillation to take place unnecessarily. If you are unable further to reduce coupling between the plate and grid circuits of the reflex tube, you can stabilize the operation by decreasing the capacity of the fixed condenser across the reflex transformer or by removing it entirely.

When you have operated the Counterflex a little you will notice that different adjustments are required for local and distant stations operating on the same wave length. The strong carrying waves of local stations set up forced oscillations in the circuits of the receiver which cause the set to howl unless the amplification is reduced in some way. If the amplification is permanently reduced (as in some receivers) so that the set will not howl at all, the audibility of the system is very low. For the receiver to possess real efficiency it must be possible to regulate the amplification so that local stations can be received without howling and the audibility increased to receive distant stations.

The Counterflex of the Counterflex receiver controls ordinary self-oscillation effectively, but it cannot damp out the strong forced oscillations set up by the carrying waves of local stations. As I explained at the beginning of this article, my first method for taking care of these two

conditions was to provide a switch which reversed the "phase" of the current in the primary of the Counterflex T2. In one position of this switch the audibility of the receiver was low but sufficient to receive local stations without howling. In the opposite position of the switch the audibility was very much higher, so that distant stations could be received.

This method, however, complicated the wiring and was somewhat unsatisfactory. I decided to dispense with this switch and insert a rheostat in the detector tube filament circuit. This improves the quality of reception and acts as the needed control of amplification to prevent howling when receiving local stations.

Remember, then, that if by turning the Counterflex you are unable to stop howling when your receiver is tuned to a local broadcasting station you must then lower the filament of the detector tube. When the local station stops sending you will find you can raise the filament of the detector tube without producing any howl, showing that the howl was caused by the carrying wave.

There are two methods of operating the Counterflex receiver. The first method is absolutely fool proof but much less efficient than the second:

(1) After the manner of the Neutrodyne and other receivers which have no variable control of amplification or self-oscillation (other than rheostats) adjust the Counterflex and the detector tube filament rheostat so that it is impossible to make the receiver howl, no matter what frequency or station the circuits may be tuned to. The Counterflex and rheostat can then be left permanently in their respective positions and different stations tuned in by revolving the two tuning dials alone.

(2) Adjust the detector tube filament to normal brilliancy and, after tuning in a station by means of tuning dials, accurately adjust the Counterflex so that the correct amount of counteraction is obtained to insure maximum sensitiveness for the reception of the particular frequency to which the circuits are tuned.

Only lower the brilliancy of the detector tube when by means of the Counterflex it is impossible to prevent howling caused by local stations.

3XP Style Wire-Ups of the Simplified Counterflex

(Continued From Page 93)

first prong of jack No. 16 to terminal No. 1 of counterformer No. 8.

Wire No. 19: From terminal No. 2 of counterformer No. 8 to plate terminal of tube socket No. 3.

Wire No. 20: From plate terminal of tube socket No. 3 to rotor of counterformer No. 12.

Wire No. 21: From stator of counterformer No. 12 to condenser frame of counterformer No. 7.

Diagram No. 6

Wire No. 22: From terminal No. 3 of counterformer No. 8 to one side of grid condenser No. 10.

Wire No. 23: From stator of condenser of counterformer No. 8 to Wire No. 22.

Wire No. 24: From open side of grid condenser No. 10 to grid terminal of tube socket No. 4.

Wire No. 25: From stator of condenser of counterformer No. 7 to terminal No. 3 of counterformer No. 7.

Wire No. 26: From grid terminal of tube socket No. 3 to Wire No. 25.

Wire No. 27: From rotor of condenser of counterformer No. 7 to terminal No. 4 of this counterformer, then to open side of condenser No. 11 and terminal "G" of transformer No. 5.

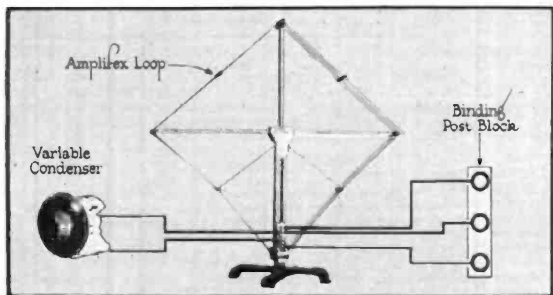
Wire No. 28: From "antenna" binding post on strip No. 1 to Fahnestock clip on counterformer No. 7. Use flexible lead for this connection.

Notes on Our Inverse Duplex

(Continued From Page 26)

center binding posts. We now have a six-volt battery which contains a sufficient amount of electricity to enable us to operate these four hard tubes without too much drain on the batteries. Each one of the tubes draws one quarter of an ampere, and so the four tubes together draw a total of one ampere out of the battery. As

neutrodyne as given in the September issue. Turn to diagram No. 1 at the top of Page 11. The only change to be made here is to substitute a thirty-ohm rheostat in place of the six-ohm shown at No. 25 on that diagram. Now turn over the page and look at diagram No. 3 at the top of Page 12. You will see a wire going

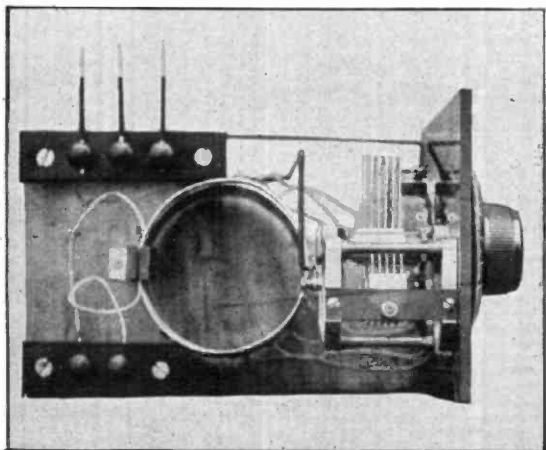


H. M. N.'s "harmonic" condenser should be connected in this way to an Amplifier loop

we have these dry cells in parallel, we divide the total drain between the two banks, which means that on the total drain of one ampere we are taking only one-half ampere out of each set of four cells. This one-half ampere drain is well below the normal drain on a dry cell and a good set of cells ought to last for some time under this drain.

I wish now that you would take your September and November issues and indicate on the diagrams the

from one side of condenser No. 28 to the grid connection of socket No. 17. You should disconnect this wire at the grid terminal on the socket and insert in the line at that place an ordinary grid condenser .00025 mfd. and a grid leak of about two megohms. In other words, one side of this grid condenser and leak will be connected directly to the grid terminal of the socket and the other side will be connected to the end of the wire which you have just disconnected.



This view—looking straight down—shows clearly how we made our aerial adapter for the inverse duplex neutrodyne or Pfanstiehl sets

changes which ought to be made for operation on A tubes in both circuits. You may not want to make the change at the present time, but it is wise to mark it on the diagrams, because, some day, you may lend your copy to a friend who will want to use an A tube for detector and the information will then be at his disposal without a lot of bother in hunting for it.

Let us take first the inverse duplex

The third and last change is given in diagram No. 6 at bottom of page 13. There you will see a wire going from the center binding post of variable condenser No. 28 over to the negative filament connection of socket No. 17. Disconnect this wire from the negative filament connection of the socket and carry it over to the positive filament connection of the socket instead. That is all of the

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"Pioneers of Better Tuning"

538 S. CANAL ST. CHICAGO, ILL.

B-T LOW LOSS TUNERS
Made in two types for Broadcast or Short Wave work.
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To cover the above ranges it is necessary to use only a 250 M.M.F. (L-11) Condenser.

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THIS COIL IS EXACTLY ADJUSTABLE TO SUIT YOUR ANTENNA AND GROUND, NOT A COMPROMISE.

THIS COIL IS ADJUSTABLE TO SUIT YOUR TUBE, PLATE VOLTAGE, AND WIRING PRECISELY, IT PREVENTS SQUEALING AND RADIATION.

THIS COIL ROTATES TO CONTROL VOLUME AND CLARITY

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SELF SUPPORTING LOW LOSS WINDINGS OF LARGE WIRE, LOWEST POSSIBLE RESISTANCE AND CAPACITY NO ENERGY ABSORBING TUBING

LESS THAN 1/2 OZ. PURE HARD RUBBER AND BAKELITE A MINIMUM OF ENERGY ABSORPTION

REDUCES STATIC TO A MINIMUM BECAUSE OF ITS SHARP SELECTIVITY

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You can make
it come in
clear

THERE'S a lot of satisfaction and enjoyment in perfect reception. Yet it does not come merely with having a good loud speaker.

It's the work of Jefferson Transformers to provide full, smooth amplification—furnish the loud speaker with the proper energy so as to assure the greatest volume with consistent purity of tone.

Proper design prevents howling and distortion. You want more than noise from your loud speaker; that's why Jeffersons are made to a ratio which assures clarity.

Even amplification over the entire musical range, perfect reproduction of the voice or instrument—these are some of the reasons why radio authorities and music lovers the world over are recognizing the superiority of Jefferson Transformers.

Designed by a concern with over 20 years experience in the manufacture of high grade transformers of all descriptions, Jefferson Transformers meet matched construction specifications.

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Manufacturers of
Bell Blowing Transformers
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Automobile Ignition Coils
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Break Ignition Coils
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**Jefferson
Transformers**

THE AMPLIFEX LOOP



Litzendraht wound.
Tapped for 3, 4, 6,
9, 10 and 13 turns,
with NO DEAD END
LOSSES. Wave length
range 88 to 1000
meters.

Collapses by turning
one thumb nut.
Compass in base for
directional adjustment.

43 inches high, 39
inches wide.

Guaranteed to be the most
efficient Loop made

Mr. Henry M. Neely says:
"Very fine workmanship.
... extremely clever.
... its efficiency has surprised
me."

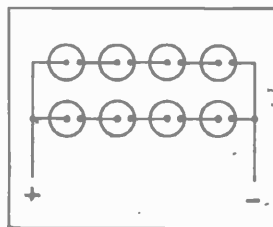
MANUFACTURED BY
AMPLIFEX RADIO CORPORATION
Arlington, Mass. Dept. U.

change necessary in the inverse duplex neotrodyne.

We will now do the same thing with the inverse duplex Pfanzstiel as given in the November issue.

Turn to Page 19, diagram No. 1, at the top of the page, and substitute a thirty-ohm rheostat instead of the six-ohm shown at No. 24.

Now turn over the page and look



Dry coils should be connected in this way to use four A tubes in the two inverse duplexes

at diagram 3 at the top of Page No. 20. You will see there a wire going from the stator plates of variable condenser No. 26 over to the grid connection of socket No. 16. Disconnect this wire from the grid binding post and insert there the 00025 grid condenser and the two-megohm grid leak. Then in diagram No. 6 at the bottom of Page 21, you will find a wire going from the rotor plates of variable condenser No. 26 over to the left-hand filament connection, or minus of socket No. 16. Disconnect this wire from that filament connection and take it over to the right-hand, or positive filament connection of socket No. 16. That is all the change that is necessary.

The sets can now be used with either hard or soft tubes as detector. Personally I use the hard or A tube regularly for my concerts and then put in a 200 or 300 detector tube when I want to go after DX.

Many readers have written in that they are using the inverse duplex neotrodyne or the inverse duplex Pfanzstiel with very excellent results, except for one most annoying feature, and that is that, as they are listening to a concert, a howl begins suddenly and unexpectedly and that it becomes so strong that it totally drowns the signals.

It just happens that we got the same effect here. One night I determined to investigate this, and so, in order to get at my set, I moved my Thorophone loud speaker farther away. When I did this the howling stopped. That indicated at once what the trouble was. The windings of the magnet coils inside of the base of the loud speaker were within a foot of the right-hand audio-frequency transformer and these two coils were "coupled" by means of magnetism to each other and their magnetic fields were clashing in such a way as to produce a howl.

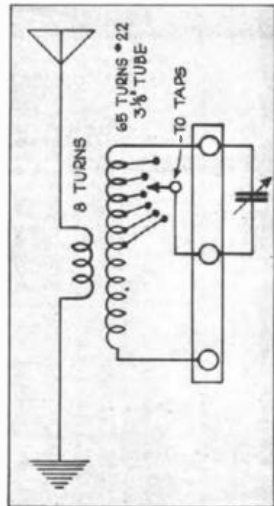
Fortunately, on that same evening, a friend of mine who had also built the set, called on me and said that he had had the same trouble using a Music Master loud speaker. He found that when he put his loud speaker on a separate table about three feet away from the set the howling stopped and he has not been troubled with it since. For those of you who are troubled with this howl these two instances may be a solution.

Both the inverse duplex neotrodyne and the inverse duplex Pfanzstiel can be operated most successfully on an outdoor antenna without the loop. It has taken us some time to determine on a satisfactory adaptor for this purpose, but our experiments

have been successful and I am giving the adaptor here. I am now using the set with this aerial adaptor regularly.

I am showing with this article photographs as we made it. In these photographs you will probably wonder how the coils were wound. You do not see any bakelite form, and this may be a new idea to you.

Well, we simply adopted one of the cleverest new pieces of apparatus that has recently been put on the market. It is known technically as "Coillite" and though this name might make you think that it is some kind of mineral dope, it is no such thing. Coillite is the name given to coils sold in lengths of about two feet each. The coils are wound on the stuff gotten out by the du Pont people known as pyrolla, which hardens and stiffens and makes a very durable and strong support for the coils. These coils are wound and sold with any kind of wire desired and any kind of spacing. They come in two-foot lengths, as I have said, and when we want a coil, let us say, of sixty-five turns, we take a length of Coillite, count off sixty-five turns, take our penknife and cut the coil off at that point. We then have our coil already wound and it has taken us only about two minutes. Also it is wound much better and much more durably than we could wind it ourselves. Every



"Schematic" wiring diagram of the aerial adaptor

radio experimenter should have a dozen or so two-foot lengths of this Coillite of various sizes and spacings on his shelves. It is mighty handy in building any of the new circuits because it means that coils are almost instantly available in any form called for by the specifications of the circuit.

For this aerial adaptor, we simply took one of the coils wound with No. 22 double cotton-covered wire, counted off sixty-five turns and cut the coil off at that point. That gave us our secondary. Then, for the primary, we counted off ten turns and cut the coil. This gave us our two coils.

We then took two narrow strips of hard rubber, mounted them on a brass angle on the base board, placed the two coils between them and inserted between the coils a machine screw and nuts so that we could draw the hard rubber strips together as tightly as we wished in order to

hold the coils wherever we wanted them. This gives us a variable inductance—that is, on strong local stations we can raise the primary coil two or three inches away from the secondary and so keep away from too much noise and also, incidentally, very much increase the selectivity of the set.

The two terminals of the little primary coil are connected to the two binding posts on the left-hand side of the baseboard and these two binding posts connect to aerial and ground.

Let us now turn to the secondary and see how we connect it.

The top wire of the secondary goes to the binding post on the rear of the binding-post block intended for the loop in both the inverse duplex neotrodyne and the inverse duplex Pfanstiel.

We then come to the only tiresome job of the whole thing, and that is tapping the coil, but this is not really such a hard job as you may think.

We took off ten taps—second turn, fourth turn, seventh turn, tenth turn, fifteenth turn, twentieth turn, twenty-fifth turn, thirtieth turn, thirty-fifth turn, fortieth turn. One of the standard back mounted tap switches is then mounted on the panel—the Carter or the Yaxley or the Marco are excellent for this purpose—and these taps are wired to the various taps on the switch. The connection for the blade of this switch is then wired to the center binding post on the loop binding-post block.

The bottom wire of the secondary coil is then connected to the binding post nearest to the panel on the binding post block.

Now this is all that you will actually need for your aerial adaptor. We show a little variable condenser on ours and I am giving it here because it does the most remarkable things with this set. It really increases the volume by about 50 per cent. Just why this is so, Mr. Grimes and I cannot agree. I have my own theory and I must plead guilty to having introduced this little feature, but Mr. Grimes does not accept my theory. In fact he ridicules it. He ridicules it so much that every now and then, when I get a letter from him, he asks me sarcastically, "How is your little harmonic?"

This is because my own theory is that with this small condenser—it should not be greater than seventeen plates nor less than eleven—with this small condenser we tune a small portion of the loop to the harmonic of the incoming wave and we feed this harmonic into the set as well as the fundamental, thus utilizing the energy of both fundamental and harmonic. It may be that Mr. Grimes is right and that I am wrong, but the fact remains that I figured the thing out on that basis on paper before putting it together and when I put it together it did just exactly what I expected it to do. So I will here answer Mr. Grimes' many questions about it and state definitely: "My little harmonic is mighty fine, thank you."

We are showing here one of those very fine and efficient little Bremer-Tully .0025 variable condensers. This condenser is so compact and convenient that it mounts nicely on a small baseboard 6x7 inches along with the tap switch.

Now to connect this condenser, you run a wire from the stator plates directly to the center binding post of the loop block—the binding post which is already wired to the tap switch. The rotor plates are wired to the top winding of the secondary coil or to the rear binding post on the loop block.

Of course this variable condenser gives you another control on your set,

but it is not a control which increases the difficulty of finding stations. This variable condenser and the first variable condenser on your set work more or less together—that is, when this condenser is set higher, the first condenser on your set will be set lower. They are not, however, absolutely dependent on each other and my own experiences have convinced me that my harmonic theory is really correct.

Using this aerial adaptor, you will certainly not want to use a soft tube for detector because the volume on nearby stations will be much greater than your set can stand. You should have a loop for reception of signals from any broadcasting station which ordinarily comes in with fair strength.

It is very easy to substitute a hard tube for a detector in either one of these sets by the method given in this article. Let me advise you to make these changes in your set anyhow, because, even after they are made, you can still use your soft tube or substitute a hard tube in case you are receiving strong signals. The soft tube will undoubtedly increase your signals when you are DX hunting and do not care to have quality, but, when you are sitting down to listen to a good concert and want quality, you will take your soft tube out of the detector socket and put your hard tube in there. This will not require any change in the B battery voltage because the hard tube acts as a detector with perfect satisfaction on the same B battery voltage you use on a soft tube.

I have received a great many letters from readers asking me where they can buy a loop which is suitable for this circuit and stating that they do not know how to make a loop, and add that they do not want to take the trouble. I have been looking all over the market for such a loop. There are many very excellent loops on the market, but this particular set, with the tap in the middle, requires a much larger loop than the standard one, principally because we specify a .0003 variable condenser in the first step. Also, all of the standard loops are built for superheterodynes which have a .0005 condenser to tune them and consequently a large loop is not needed with them.

Not long ago our Boston representative, G. P. Allen, sent me word that he had found the kind of loop that I wanted and he had one forwarded to me. It is known as the Amplifex and it proved to be all that G. P. predicted it would. It is a large loop, but has a number of taps on it as is shown in the photograph, and it can therefore be adapted to any set of wave lengths from 100 up to about 900 by the use of these simple taps.

For our purposes in the inverse duplex neotrodyne and the inverse duplex Pfanstiel, we wire the top tap to the rear binding post on the loop block and the bottom tap to the front binding post on the loop block.

The grid lead can then be taken off of either one of the two middle pairs of binding posts, leaving the connecting link in place.

Much better results can be had by taking the grid lead off of the top of these binding posts—Nos. 4 and 5 as you count from the bottom—connecting the stators of my little "harmonic" variable condenser from this same Nos. 4 and 5 and the rotors to taps 2 and 3. With this you have very excellent control of the volume and quality at all times.

In this connection John De Q. Briggs, the man who first inverse duplexed the neotrodyne for us, writes me that he also has been working to get away from the bother of tapping a loop. He has been work-

(Continued on Page 62)



The men who know say "Use Formica"

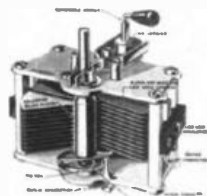
ONE hundred and twenty-five of the leading radio manufacturers of America by their example tell you to use Formica as the panel and tube material in the set you are building. They use it themselves—because they know it to be the most uniform, best looking, most satisfactory form of Bakelite.

The bigger the panel you use and the more apparatus you mount on it the more important it is to use Formica. For Formica will not sag, warp or get out of shape—it has the strength to give you years of perfect service. This year, scores of manufacturers will use Formica base panels, and Formica terminal strips. They stop electrical losses and greatly increase the efficiency of a set.

There is no question as to which is the best radio insulating material—and you want the best. Four beautiful finishes: Gloss black, flat black, mahogany and walnut.

Dealers: For the big Neotrodyne and super-hetrodyne panels, Formica is practically a necessity. Formica will sell stronger than ever this year.

THE FORMICA INSULATION COMPANY
4684 Spring Grove Avenue, Cincinnati, Ohio



9 points of Superiority

- 1—Molded brass plate, stator plates for easy tuning on low waves.
- 2—Adjustable ball-bearing rotor, ground through metal end-plates.
- 3—Clock spring pivot, minimum dielectric, leaves too small to measure.
- 4—Rugged, compact construction; cannot warp.
- 5—Microfuser varnish; no backlash.
- 6—Take any size dial.
- 7—The result of 14 years' experience making precision instruments.

U. S. and Foreign Patents

The Outstanding Achievement of Modern Radio

The new Model "C" Hammarlund Condenser has the precision of a watch.

It includes every refinement demanded by experts and assures the amateur a quality of reception heretofore unattainable.

All Capacities. Plain and Vernier. Sold by the Better Radio Dealers.

Write for interesting folder

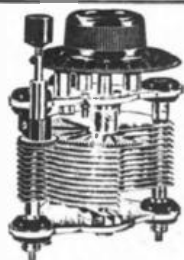


HAMMARLUND MANUFACTURING CO.
426-628 W. 32d Street, New York



Concert With Coffee or Coffee With Concert

(Continued From Page 12)



HEATH RADIANT Non-Dielectric CONDENSERS



Marconiphones

Used by Marconi

In designing a receiver to bear the magic name of "Marconi" only the most dependable instruments were safe even to consider. The eventual selection—after exhaustive research and tests—of HEATH CONDENSERS for this famous receiver, tells a convincing story of lasting dependability—the hidden extra value that you get with every Heath Condenser. See the Heath Condenser at your dealer's.

Permanently Flat Plates

Stamped under heat pressure to absolute flatness and tempered to prevent warping.



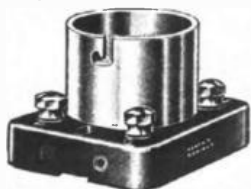
Micrometer Geared Vernier

Ordinary adjustments reduced by accurate geared adjustments to help through distinction. We guarantee the Heath Vernier Condenser to be more highly sensitive than any condenser employing a vernier which creates ALL of the plates.

Prices for Vernier Condensers

	With Dial	Without Dial
No. 12AV 12 Plate	\$4.00	\$4.25
No. 24AV 24 Plate	5.50	4.85
No. 48AV 48 Plate	6.50	5.85

Non-Vernier types in all capacities. Heath Sockets with the Exclusive Shock Absorber Feature. The Heath Bakelite Case is 3 diameters.



Heath Sockets with the Exclusive Shock Absorber Feature

Bakelite base into which re-entrant phosphor bronze self-lubricating contacts are securely embedded. Binding posts are slotted hexagon nuts. HEATH Standards of material and workmanship... Price The

WRITE FOR LITERATURE

HEATH RADIO & ELECTRIC MFG. CO.

205 First St. Newark, N. J.

Canadian Distributors:

Marconi Wireless Telegraph Co. of Canada, Ltd.

only way to obtain the good will of the listening public is to offer them the best in music as well as in commodities, engaged Miss Byrne and her men as the Astor Coffee Orchestra. Of her group Miss Byrne says:

"I never engage a man unless he has been a symphony player, because they have better instruments and a sounder musical training. A man can be trained to dance music, but not up to classical compositions. One reason why the Astor Coffee Orchestra is superior to most dance orchestras is that it uses an unusual number of string instruments and very little brass, which is just the reverse of most jazz orchestras. Furthermore, I like to adapt my music to the people for whom I am playing. I play fast and gay for young people and bright lights, and more softly and slowly for middle-aged folks and subdued lights.

"Another thing," she continued, "is that I don't believe in 'trick' music or special arrangements, of which people tire. I get my accents from interpretations and do not attempt to offer an orchestra which is a set specialty or in any way eccentric. I have no star, either. The trios vary from night to night."

A typical trio includes Miss Byrne herself at the piano, with Abram Borodkin, cellist, and Abram Coan, violinist. Coan has been with the Philharmonic and New York Symphonies and Borodkin with the Russian and State Symphonies. For that matter, even the drummer, Harry Stittman, is a symphony man.

So then, at 9 o'clock on Friday night you tune-in for the Astor Coffee Orchestra and you are deep in enjoyment of one of the treats of the week, when suddenly, at about 9:30, instead of another musical number Announcer Carlin introduces Miss Elizabeth Hallam Bohn, and your wife seizes her pencil.

The music for the evening has been a Spanish program, and now comes a pleasant woman's voice, talking briefly on the uses of rice in Spain, and ending by giving a recipe for Spanish rice. Three to five minutes and she has gone, and the orchestra is playing "La Paloma."

Who is Miss Bohn and what are the results of her five minutes on the air once in two weeks? One question at a time.

Miss Bohn enjoys a most impressive title, but fortunately it has not succeeded in de-humanizing her. She is a Home Economics Consultant and an Instructor in the Home Economics Department of New York University. In fact, she seems to have reversed her own first two initials, which are E. H., in order to make them H. E. for Home Economics, because you simply can't talk about her and not that that subject. For instance, she was formerly on the Home Economics Staff at Columbia University; and she was Home Economics Editor of the Delinquent and the Woman's Magazine. She is on the lecture staff of the public schools, in which capacity she gives talks on such topics as "The Story of Corn" or "The Story of Silk." She also operates her own newspaper syndicate service on "Helpful Hints to Homemakers."

Here again B. Fischer & Company chose wisely when they selected a

woman who is considered an absolute authority on household management and thrift to give talks to housewives that are so important a part of their Friday night program. Miss Bohn has for years made a scientific study of how to help women in the management of their household duties. She knows their needs and their interests. The personal touch that this gives her work is exactly what is needed over the radio, and her attitude toward the opportunity for service presented by this medium of advertising is intensely valuable. She says in part:

"Radio is the most valuable means of giving serviceable information that has been devised. When the housewife sits down in the evening to listen-in, she is in an easy chair, relaxed and comfortable, and so in a most receptive mood. Therefore, I feel as though I am merely woman talking to woman. Furthermore, if any member of this great silent audience responds to the contact I offer her, she does so entirely of her own volition, with no compulsion whatever. Any sign that she makes must then be really indicative of interest, and proves that she finds my information of real value."

Of course, Miss Bohn makes this five minutes an informal and agreeable as possible. There is nothing didactic or over-emphatic about the information she gives. She is as apt as not to begin or conclude with some purely amusing nonsense, such as the following limerick:

*There was a young housewife of yore,
Who found cooking a horrible bore,
She wracked her poor brain,
Till she went quite insane—
'Twas all she could stand—and more!*

*There is a young housewife today,
Who cooks rice the Astor way;
From soup to dessert
She's apt to assert,
'King Rice' in her household holds sway.*

B. Fischer & Company realize that two factors are necessary in the sale of goods. First you must have a really worth-while commodity to offer, and, secondly, you must obtain the good-will of your proposed clients.

They make use, of course, of all regular advertising mediums, such as newspapers, car signs, etc., but when radio broadcasting became an accepted fact, its possibilities early interested them. They were one of the pioneers in testing its value and began with an hour program every Friday night through the one station, WEAF. When the second year came around, as a result of several tests, they decided upon the present five minute tie-up on alternate Fridays. By this means they reach most of the radio sets in the territory east of the Mississippi, which they feel is all they want, as their particular commodity, roasted coffee, cannot be shipped successfully over too large a country without losing its strength. However, within the range of these five stations, they figure they reach something like four million people, all of whom, as Miss Bohn says, are being approached in the pleasantest possible manner, and at a time and in a mental and physical condition which makes them most receptive.

The method of indirect advertising is a quite recent development and is

a long, long step away from the ancient methods of the "blarbing" press agents, who didn't care how thick they laid on the exaggeration in their copy. When the American Telephone and Telegraph Company first announced their policy in regard to the publicity that was to go out from their station, they said definitely that no one would be permitted to go on the air with any such talk as that "The Smith Motor Car will go more miles to a gallon of gas than any other car on the market." If Smith wanted to advertise his cars he would have to do it much more subtly and artistically than that, and do it cleverly enough for the audience to be sold without being bored when it was looking for an evening's entertainment. A rigid adherence to this policy has resulted in the present schedule of delightful numbers, of which that of the B. Fischer Company is one of the most enjoyable.

You will note, for instance, that in the opening speech, instead of saying that "B. Fischer & Company are glad to serve you continually with both coffee with your meals and good music after them," the words "the universal beverage" are substituted for coffee as being less direct advertising. Similarly their slogan "Always Good Taste," is never used in their programs.

As a matter of fact, the program directors at WEAF felt at first that the injection of the talk on how to use rice or coffee into the musical hour was a great mistake and would call forth severe criticism from the listeners-in. They wanted it put into the morning housewives' program.

But here was where the actual results of the excellent concert coupled with this five-minute interlude showed. B. Fischer & Company were able to produce actual figures indicating that on the strength of this broadcast information the grocers of almost the entire Metropolitan district had been able to sell out completely the stock of rice on their shelves. Furthermore, the letters from the listeners-in, instead of indicating displeasure, in practically every case showed that the recipe was quite as popular as the music.

Any number of these letters might be chosen almost at random, as for instance:

"Dear Sirs:

"Kindly send me recipe for apple-ric pudding which was given over the radio last evening, Oct. 10, 1924. The musical program was most enjoyable."

Or again:

"Dear Sirs:

"Listening-in on the radio last night we were very much pleased with your talk and music and hope very much to hear from you all again as it makes the evening very pleasant to hear you."

"I will now ask you if you would please send me the recipe of the rice pudding that was given over the radio by the young lady. I could not get her name."

In the first year over fifty thousand letters of this kind were received. Practically no bad reactions to the insertion of the talk have been had. These letters are of use in more than one way. They show the orchestra what type of music pleases the public, so that Miss Byrne is assisted in



making up her programs. They help Miss Bohn to choose her information as they ask definite questions, and they are sent to salesmen to use on the road as general propaganda work.

One very important factor in the value of radio is that it reaches all types and classes of people. Miss Bohn had a most unusual experience, in that within three days her landlord, her chauffeur and her mailman all told her what they thought of her broadcasting.

Of course, this type of publicity, which depends almost entirely upon obtaining the goodwill of the buyers by an indirect means such as the orchestra, is only practical for well-known products, because not enough information can be given in this way to acquaint people with something that is new on the market. But for anything with a registered trademark the results are practically certain.

The real test of its value will come this year, the Fischer Company thinks, because with the tie-up they will reach country districts that are not reached by other types of advertising. What they may expect is shown by one instance which occurred during one of their trial tie-ups with WCAE. After they had broadcast through that station one Friday night they received a request from the office of a firm owning eight hundred chain grocery stores in Pittsburgh and the surrounding territory asking that they send enough posters of their orchestra to display in each store, as there had been so many requests for information since that Friday night.

All this time the Astor Coffee Orchestra has been finishing its program of Spanish music, and as your wife carefully folds up her slip of paper you lean back with a sigh of content. There is a new dish on the horizon.

What is that the announcer is saying?

"Good music well played and good coffee well made are not so far apart. They both belong to a pleasure-loving people, so be sure to tune in on this station two weeks from tonight at 9 o'clock and be just as sure to brew your coffee the Astor way.

"Two weeks from tonight the Astor

Coffee Orchestra will play for you the music written by the famous English composer, for it will be 'English Night.' B. Fischer & Company, packers of Astor Coffee and Astor Rice, invite your comments and suggestions on these special programs. Address your letter or card to The Astor Coffee Orchestra, care of Station WEAJ, 195 Broadway, New York City. Also request Miss Elizabeth Hallam Bohn's folder of famous rice recipes and the booklet on 'Coffee and Coffee Making.' "Good Night."

Grimes Takes the Hum Out of His "3XP"

(Continued From Page 24)

to the set with sufficient volume to affect the grid of the second audio transformer. By making the interchange as indicated in Fig. 2, this induction hum from the aerial will be impressed on the filament side of the secondary of the second audio instead of the grid. This will eliminate any such disturbance. Here, too, the tuning on the dial will drop several degrees due to the secondary-primary capacity of the audio transformer in the grid circuit.

These changes may drop your tuning on the dials so far as to lose some of the very low wave length stations. You will then have to remove two or three turns from the secondaries of your radio transformer. This shifts the tuning back again to its proper position. The tuning condensers are now of filament potential when considered from the audio-frequency circuit, and may, therefore, be mounted on metal panels without insulating.

We recommend that you confine your changes in your 3XP inverse duplex to the interchange of transformers in the grid circuit of the second tube. We feel that this will meet the vast majority of the difficulties now being experienced in some sections of the country.

Let's try this one out, and if any more of you have any inverse duplex nuts to crack, shoot them along and we will at least attempt to solve them. Good-by, hum! What's next?

Talk About Your Selective Sets!

DUNKIRK, N. Y.

HENRY M. NEELY,

PRESIDENT NEELY PUBLISHING COMPANY,

608 CHESTNUT STREET, PHILADELPHIA, PA.

CONGRATULATIONS ON YOUR GRIMESODYNE, IT'S SURE A CUCKOO; THE ONLY TROUBLE IS SHE TUNES TOO FINE, SPLITS HAIRS; HAVE PUT ON ACCURATETUNE DIALS AND MADE VERNIER SCALES TO SUIT ON PANEL SO CAN GET ONE-TENTH OF A DIVISION ON DIAL OR ONE TWO-THOUSANDTH OF ONE REVOLUTION AND READ ADJUSTMENT IN DECIMALS OF ONE GRADUATION AND, AT THAT, AM ON OR OFF WAVE ALL DIALS. WILL REGISTER EXACTLY SAME WITH CORRECT GRID TAP AND POTENTIOMETER SETTING, MAKING IT SLOW WORK PICKING UP ANYTHING. CAN YOU SEND ME SOME DOPE TO BROADEN; JUST ENOUGH TO TELL WHEN YOU ARE ON THE EDGE OF A WAVE RECEPTION WHEN YOU GET IT RIGHT? AS CLEAR AS A BELL; GOT A SUPER SET BEAT FORTY WAYS.

JOHN PLAYER

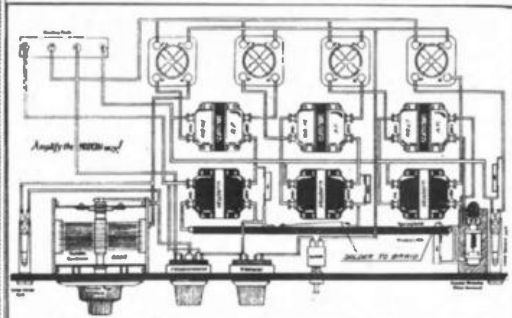
Here is a reproduction of a telegram received from a "Grimeso/an"



One Dial

But one dial to tune, no unsightly outside Antenna, no Ground to bother with. It's easy to get Volume, Distance and Selectivity with the

MODERN Super-Six "REFLEX"



This set is easy to build and your friends will marvel at the results from this set. Full size wiring diagram and complete construction bulletin of above circuit sent on receipt of 4 cents in stamps. Write for it today.

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World's Largest Transformer Manufacturers Making Transformers Exclusively for Radio Purposes.

MODERN Engineers have steadfastly refused to cheapen their product to meet the requirements of some set manufacturers. When you buy MODERNs in a set you'll know your was not the consideration for the manufacturer's choice of MODERN Transformers.



The Best Wave Trap

we know of can be made by any novice in fifteen minutes. A .001 variable condenser, some wire, a salt box or other form—and your set becomes 50 per cent more selective. Full instructions and pictures were given on Page 24 of our issue of April, 1924, under the title:

"YOU CAN SUPPRESS THAT INTERFERENCE"

If your set is not sufficiently selective, it will pay you to try this wave trap.

Send 10 cents for a copy of the April issue to

Circulation Department

RADIO IN THE HOME

608 Chestnut St., Philadelphia

Now you can UNDERSTAND RADIO!

Take the mystery out of it—build and repair sets—explain the vacuum tube—operate a transmitter—be a radio expert!



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Army Instructor
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Technically Edited by F. H. Doane
100,000 ALREADY SOLD

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No rheostat knobs on panels to turn—no meters needed—no tube worry. One AMPERITE, used in series with each tube, inside the set, automatically supplies just the right current for each individual tube's greatest efficiency. Works on thermo-electric principle. Simplifies wiring. Reduces set cost. Proved in use. Adopted by more than 50 set manufacturers. No set is up-to-the-minute in design without it.

RADIALL COMPANY
Dept. R. H. 3 50 Franklin St., New York

AMPERITE
"means right amperes"

Los Angeles Entertainers Are Fast Becoming Stars of Radio Throughout U. S.

By Ralph L. Power
Los Angeles Correspondent of
Radio in the Home

WITH one 1000-watt station, four of 500 watt power and the expected erection of at least two more this winter, Los Angeles is experiencing an orgy of radio entertainment. Yet, through it all, there are perhaps a half dozen figures that immediately pop into the public mind when KFI, KHJ or other Los Angeles radio stations are mentioned.

Charlie Wellman, who calls himself the "Prince of Jazz," hasn't sung from KHJ long enough to tire of the fan mail. He still answers his own correspondence and sends in return a cute little card with a picture of him "doin' his stuff." When he isn't singing some jazz melody over the air he is tucked away in his study hatching out some new tune to please radioland.

Charlie Wellman started crooning his jazz tunes over WDPJ in

she began to learn them all. And now her repertoire of folk songs of the French and American totals in the hundreds and she is constantly adding to the already imposing list. She sings in five languages and presents a French program every month through KFI as well as afternoon musicals of old-time American tunes each week. On the Los Angeles

Examiner programs, she is often called "the Radio Songster."

Most of you who are DX hounds have tuned in Southern California stations and have heard the sweetly ringing chimes of KFI or the cheerful warble of the canaries at KHJ. Well, you've probably heard an unmistakable Southern accent say, "Yass, suh, Noo, suh, we didn't have the hoof and mouth disease. It wasn't that a-tall. Noo, suh. It was the hip and mouth disease."



(Top) Floryane Thompson



Hatch Graham



(Center) Edwin Hubbell



Charlie Wellman



(Below) Uncle Remus

Chicago when radio was young. He was a radio fan and he wanted to know how it felt to face the microphone knowing that thousands were listening in. "Oh," says Charlie, "it was terrible the first time, not so bad the next, and now I don't mind it a bit."

KYW in Chicago claimed Charlie for a long while, singing from the Evening American Studio at each midnight show. He says the biggest thrill that ever came to him was when he sang in Chicago and his mother in Hollywood heard the selection. She phoned Chicago and asked Charlie to sing again. The studio people held the phone and Mrs. Wellman, in Hollywood, placed the loud speaker near the transmitter. So the Chicago party heard the songs which went all the way to Hollywood via radio and back again to KYW over the telephone.

And now, in the sunny clime of the Southland, Charlie Wellman is crooning his happy melodies mostly from KHJ and he also acted as master of ceremonies for KNX on their opening night.

Did you ever hear of a French girl who has a larger repertoire of American old time songs than American singers? Well, here's one!

Floryane Thompson, of a family of French artists, was born in Versailles and, after learning English in the British Isles, came to the United States but twelve short years ago. These eventful years have passed only too rapidly and she has sung hundreds of times at hospitals and sanitariums. But the radio brings her a

well, folks that was Uncle Remus. There are a number of Uncle Remus people in radio entertainment but this Uncle Remus, who is none other than E. M. Bonnell, first took the name some twenty years ago when he was writing short sketches and the name has clung to him ever since. Uncle Remus has been doing a black-face musical act for some thirty years and has naturally studied the characteristics of the colored race so his imitations are about as near the real thing as possible.

This Uncle Remus is a great lover of the out-of-doors and last summer he made a Northern trip trout fishing—his favorite hobby—and there found thousands in remote hamlets and mountain cabins who already knew him via radio. The sympathy he has for those who cannot get out to enjoy the beauties of nature prompted him to entertain radioland and he has been a feature part of the KHJ programs for upwards of two years.

Uncle Remus says his face is full of wrinkles (from smiling) and he believes in the old adage, "Smile and the world smiles with you, snore and you sleep alone." Tune in some of these winter days for Los Angeles and Ol' Uncle will make you smile, too, with his cheery entertainment. Yes, he plays the celeste often. Sometimes he brings along the favorite auto harp and he's equally good with the old stand-by, the harmonica. He has a breezy line of chatter and monologues besides his plaintive melodies. Many of the tunes are his own and his "Water-

vastly wider field of usefulness and she now entertains a score of hospitals at one time and then she starts out on a tour of personal appearances.

Upon landing here, Floryane Thompson, pledged to her adopted country, became an enthusiastic devotee of old American folk songs and

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With Your Reflex

A Toroformer

(A Transformer for Tuned
Radio Frequency
Amplification)



placed ahead of
your Reflex will
give you a
Selectivity
you haven't
dreamed of with
Greater
Distance
than you have
ever had before.

It does not pick up stray or unwanted
signals, is unaffected by other parts of
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Output includes complete diagrams and
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Sets containing the TOROFORMER can be
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Please send me your descriptive folder.

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(Patent Applied For)

A NEW Four-Way Product!

Loud Speaker Extension Unit. COMPLETE

THIS COMPLETE UNIT

enables those who want to use
the loud speaker in other parts
of the house to do so without re-
moving out. Insert plug from loud
speaker into jack; place plug on
end of cord into set. This can be
done readily and saves the trouble
of using tools or soldering iron.

Prices, including Jack, Plug
and Cord:

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20-foot cord 3.25 50-ft. cord 5.50
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Four Way Co. :: Myrick Bldg. ::
Springfield, Mass.

HARKNESS REFLEX

The circuit that put efficient
radio within the reach of all.
All developments of this system
are now found exclusively in
"Radio in the Home"

KENNETH HARKNESS is one of our
Associate Editors and writes for no
other publication

melon Time," has made for him a
host of friends.

Madelyn Hardy wasn't always a
jazz piano player but it's useless to
tell that to the radio public for they
aren't interested. They know of
many players who offer classic music,
but only one "jazz queen" who can
tickle the keys the way this artist
does.

After a tour of nearly six years as
a concert pianist on the Orpheum
circuit, Madelyn Hardy settled down in
Los Angeles and often entertained
friends in her home by strumming
away on a few popular tunes of the
hour. And, from that day to this,
jazz has held her in its embrace. Of
course she often mixes the musical
diet with some of the more classic
tunes but jazz always wins out.

Locally Madelyn Hardy makes a
number of personal appearances at
clubs and other organizations and her
popularity is always in evidence by
the number of mash notes, barrels of
apples from Oregon, candy from
Arizona, and other evidence of a keen
admiration from friends in radioland.
In fact she keeps the studio force
busy opening packages and fan mail.
She is now starting on her third year
as official accompanist for the Ex-
aminer, where she is known as their
"Radio Girl" and, as such, is the only
pianist using this title west of
Chicago.

Hatch Graham, with his big-necked
nigger banjo, brings a quietness in
melodyland as his lullaby goes float-
ing out into space, for it is the kind
of entertainment that soothes tired
nerves.

"Take Me Back to Babyland,"
"Little Boy Blue," "The Ladies,"
by Kipling, and "The Angels' Ragtime
Ball," coming to you over the ether
waves mean that KHJ is on the air
and Hatch Graham is in the studio.

Hatch attributes his musical genius
to an ancestry commingled from
Irish, Scotch, Welsh and German with
a native background of music and
ballads. He rapidly passed through
the usual setting of the street corner
quartette, the high school quartette
and glee club, into a full-fledged en-
tertainer, in the Grand Opera house
of his local village. Then to college
where his native talent soon showed
itself when he adapted an old Portu-
guese hymn and set it to the words
of Kipling's "I Learned About
Women From 'em" which has brought
him more popularity in radioland than
all his other numbers put together.

Graduating from the University of
Illinois in 1923 he journeyed to Cali-
fornia in general and Southern Cali-
fornia in particular, where he was re-
cently admitted to the bar. So,
friends, Harold H. Graham, attorney-
at-law, is none other than your favor-
ite Hatch Graham of KHJ, The
Times!

This sober-faced, bespectacled in-
dividual, with the pleasant drawy
voice sings old-time ballads and
darky songs in a low, crooning sort
of voice that carries unusually well.
As you are seated by the fire in
the long winter evenings, you'll
hear him often if West Coast stations
come in upon your set.

Graham first sang from the studio
so his folks in Urbana could hear
him. Now he does it because his fan
mail refuses to abate and, rather
than try to answer the huge ava-
lanche, he just keeps on singing and
strumming away on the old long-neck
nigger banjo.

Of course, it's difficult to pick out a
half dozen popular entertainers from
any one locality. Such a list wouldn't
be complete without mention of a ju-
venile, and here he is in the person of
Edwin Hubbell, who, at the tender
age of six years, is known as the
Starlet of the Wampus, which is an
organization in movieland. Young
Edwin has played in the Jack Demp-
sey pictures as well as with Norma
Talmadge, in Sennett films, and all
over the studio world of Hollywood,

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in enclosure in case design
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of high-resistance load equip-
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functioning of Erla Superflex principles.

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Tested Crystals, and all the other matchless
Erla units are provided. You can assemble
them with perfect results virtually guaran-
teed by full-sized blueprints, drilled and
lettered panel, stenciled baseboard, precisely
locating every unit and connection. There
is no soldering, thanks to Erla Solderless
Connectors. Pliers and screwdriver alone are
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Superflex circuits, at the lowest possible cost.

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in RADIO IN THE HOME enables even a novice to build the
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wiring operation. This service creates good will and additional
sales for the dealer.

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IN THE HOME, where only quality apparatus which we have
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inferior apparatus. This service helps the dealer increase the sale
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Cash in on this good will and additional sales by bringing RADIO
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For full information write to

RADIO IN THE HOME
608 Chestnut St., Phila., Pa.

for
**Faint-Hearted
Sets!**



VT-25 Variotransformer

After you check your batteries, tubes, transformers and fixed condensers, and spot all doubtful connections, and still the music sounds like it came from Mars, pounce on your tuner. It may look innocent yet be as leaky as some people's idea of secrecy!

The L + K Variotransformer should solve your problem. It gives you the DX amplification of two fixed R. F. Transformers, makes one tube do the work of two without reflexing, and eliminates the variable condenser usually placed across tuned R. F. Transformers, along with its losses.

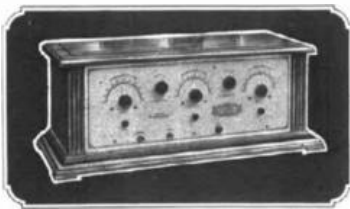
It works alone in any standard hook-up, and is very effective with the L + K Variable Clarifying Selector in the aerial circuit for fine tuning. The Variotransformer is \$8.50; the Selector is \$7.00.

SEND FOR FREE BOOK

showing complete L + K kits, Greeno Concert Selector hook-up, and other effective circuits. (Jobbers, Dealers—write.)

Dept. R., 654 Grand Ave., New Haven, Conn.

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A Guide to TECHNICAL ACCURACY
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Five-Tube Tuned Radio-Frequency Set \$120

A Long-Distance Set Without An Equal
SUPER

CLEAR-O-DYNE

Price, \$120.00

IF YOU WANT distance with loud speaker volume, no better selection is possible than the five-tube Super Clear-O-Dyne. It brings in stations from coast to coast in good weather, and will separate distant stations no more than five meters apart. It has a wonderfully clear melodious tone. The set is remarkably good-looking in its solid mahogany cabinet with engraved gold finished front panel. You will find that it is made of the best materials in the most workmanlike way. The astonishingly low price is due to the fact that all the parts are made complete in the great Clearstone factory. Dealers and jobbers are finding Clear-O-Dyne a wonderful demonstrator that sells itself.

Clear-O-Dyne Model T9	\$75.00	Clear-O-Dyne Model 20	\$120.00
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Clear-O-Dyne Model T2	\$15.00	Clear-O-Dyne Model 22	\$100.00
Console	\$125.00	Other sets from	\$60.00 up.



Five-tube Console, \$120
Four-tube Console, \$125

"In two weeks we heard 50 stations on the model 24, including CTV, Mexico City, and four stations in California."
J. W. WEEKS
Tillamook, Ont.



THE CLEARSTONE RADIO COMPANY, CINCINNATI, OHIO

In fact. This youngster prefers to listen to broadcast Programs, but once in awhile his fond parents tote him away to some station so he can talk to admirers and friends. And this, friends, is just a chatty little story about some old-time radio favorites of the Pacific Southwest. With more stations in a given city area than any other American municipality, we have such an abundance of local talent that it's doubly difficult to travel around the dial and tune in on all the local stations and do any long-distant fishing. But all you people at a distance who frantically twist the knobs to hear the Pacific Coast Stations have a good-sized chance of hearing all of these favorites and more, too, in the long winter evenings.

Cut Out This Propaganda

(Continued From Page 8)

violate the beliefs and the ideals of that home. I expected them to conduct themselves as any well-bred visitor would conduct himself in my home, and this expectation included the understanding that he would not force upon our attention any of his own personal enthusiasms in which we were not interested.

These visitors via radio have unfortunately not observed the ordinary amenities.

There was, for instance, an evening just a few weeks ago when the director of a New England station took his seat at my fireside and brought with him a woman whom he introduced to us. Now she may have been a most excellent person, but unfortunately, she forgot that she was visiting the home of perfectly intelligent and well-educated people, and she started in to talk on a subject which she called, "Eternal Youth," but which degenerated into the most absurd and puffing propaganda for some silly theory she has about vibrating in unison with the universe. Now, I am perfectly willing to vibrate, but I prefer to exercise the inalienable right of the American citizen to vibrate on any wave length which I darn well choose. I do not care to have any woman come to my home and, like a spiritual radio inspector, assign me a definite wave length on which I must vibrate for the rest of my life.

My own opinion was that her talk was the most utter drivel. I did not blame her for giving the talk; I blamed the director of the station for bringing her into my home for the deliberate purpose of giving her an opportunity to make that talk.

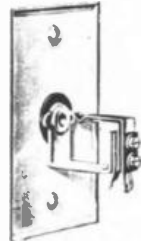
There might have been children sitting around my fireside. There weren't—God be praised—but I say there might have been. And I certainly would not like to have had my own children subjected to the influence of these theories before their minds were capable of thinking for themselves.

Perhaps I am unfair in thus publicly singling out this station in this matter. It is by no means alone. Constantly, as I turn the dials of my receiving set, or as I look over the programs published in the papers, I come across other directors who are attempting to introduce into my home all sorts of persons whom I do not care to have in my family meet.

But this is not the only kind of propaganda. My conception of this word, so far as it applies to radio, includes all forms of special pleading. This pleading may be in favor of causes which are most commendable in themselves and which have my hearty sympathy, but I submit as a general principle that special pleading of any kind is totally out of place by radio.

Not long ago, the broadcasting stations of Philadelphia made a laughing stock of one of the very finest move-

CARTER
Radio Receptacle Jack



PAT. 1-20-23

\$2

Takes Radio out of the "Messy" stage. Permits of homes being wired for radio.

Can be used for aerial and ground wires, batteries (when kept in basement) or for extending loud speaker to other parts of the home.

Complete with Standard Escutcheon Plate and Radio Name Plate.

Any dealer can supply. If not carried in stock—he will order for you.

Write for Catalog of Other Carter Radio Parts in Canada—Carter Radio Co., Limited, Toronto

Carter Radio Co.
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CHICAGO

I will buy for you!

Free 24 Hour Shipping Service for Readers of this Magazine

I will buy any apparatus mentioned in this magazine and send it, carefully packed, direct to your door, at its regular price, plus only parcel postage and insurance.

I MAKE NO CHARGE FOR THIS SERVICE

It is conducted in co-operation with Mr. H. M. Neely, and is for the convenience of his readers.

DO NOT MISS the pleasure of building the latest Gernsbee KXZ Circuit. Reports indicate they are the latest development in radio this year.

Complete Kit of Parts, including Panel, Baseboard, Crystals, Wire, and other the Fada Neutriformer or the new \$55.00 Franstahl True-former Unit

Kit adheres strictly to specifications and will build sets exactly as pictured in September and November issues.

Let us do your radio shopping. I know where to get you exactly as you want for your set.

ANOTHER NEW ONE—Perfection Supercoll

The Only Fully Adjustable Coil on the Market

The coil that is two jumps ahead of the nearest. Adds volume, selectivity and distance. Tunes away your old coupler, and get those "hard-to-tune stations" \$7.00 with this Supercoll.....

We have been ferreted to tube now and largest quarters to carry for your wants. Now address to

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INSTRUMENT TESTED

Type A, 5 volt, .25 ampere
 Read the guarantee furnished with every Atlas Tube:

"This Atlas Tube has been individually instrument tested and is guaranteed to give entire satisfaction. If unsatisfactory for any reason whatever, it may be returned within a period of thirty days to the manufacturer or to the dealer from whom it was bought, provided the filament has not been burned out.

"Dealers are authorized by the manufacturer to make replacement or refund (in such cases) whichever may be desired by the customer.

Atlas Instrument Tested Tubes are guaranteed to function efficiently in Reflex, Neotrodyne, Superheterodyne, Radio Frequency or any of the circuits which require highest efficiency in tubes.

At best dealers or direct from us. Mail orders promptly filled. **\$3.00**

SPECIAL OFFER—At no extra charge, we will furnish selected, instrument-tested, matched tubes in sets as follows:
 Reflex Set—3 Tubes \$9.00
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 They will get the most out of your Radio Set.

DEALERS and JOBBERS—There is satisfaction as well as profit in handling ATLAS TUBES, the best tubes to be sold on merchandising principles affording full protection and satisfaction to your customers.

Write or wire for proposition.



310 Coston Building, Cleveland, Ohio
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When In Doubt

concerning a good radio insulating enamel try

SAFE-GUARD INSULATION

the best enamel obtainable for stiffening all forms of low-loss coils, holding coil windings in place, and moisture-proofing material such as fiber, paper, wood, fabric, etc. Used in place of Spaggetti. Put up in transparent and red and green and black semi-transparent colors.

At Station 3KX, two bare wires were dipped in Safe-Guard, it was allowed to dry, the wires were then twisted together and tested across a "megger." Absolutely no leakage showed under a five-million ohm test.

Price 50c and \$1 Cans

At your dealers or sent direct Postpaid

Safe-Guard Insulation Co.
 Lansdale Penna.
PARAGON ELECTRIC SALES CO.
 Eastern General Sales Agents
 134 No. 7th St., Phila., Pa.

ments which we have. This movement is the Citizens Military Training Camps.

They staged a drive for the training camps at Philadelphia, and those behind the drive, knowing nothing whatever about public psychology and particularly of the psychology of the radio audience, immediately besieged the radio stations and used all of the influence which they had with the department stores to take up every possible moment of time with speakers who told about these camps. We had Citizen Military Training Camps for breakfast, dinner and supper, for morning, noon and night, until we became heartily sick of it.

Then, to cap the climax, one station utterly ruined any remaining chance to consider the matter seriously. This station, every time it signed off after every period of broadcasting every day, added the slogan, "And please, friends, don't forget the Citizens Military Training Camps." We didn't forget them. We couldn't forget them. That station drove this absurd slogan into our ears so often and at such inopportune moments that there wasn't a chance in the world of forgetting them.

Only a few days of this made the whole thing laughable. I had this most forcibly brought home to me when I was waiting for a trolley car on a street corner. Two men had been talking and when they parted, one of them waved to the other and said, "Well, good-by; and don't forget the Citizens Military Training Camps." Then they both laughed derisively.

The trouble was that the people behind this movement so badly oversold it to the public that the propaganda did harm instead of good. I have no doubt that they received a certain number of returns from this radio campaign, but they totally overlooked the fact that a vastly greater number of desirable supporters, who did not write to them at all, were alienated by the bad taste shown, and where a friendly feeling existed toward the camps before the campaign, a decided feeling of disgust and resentment was left. I know that that was so in my own particular case.

Again, later on, the same effect was caused by the Welfare Federation drive through the Philadelphia stations. Here was another campaign which was badly oversold by radio. There was no judgment shown as to the number of talks, the kind of talks, the periods of times for these talks or anything else.

Now it just happens, that when I saw the newspaper announcement of the drive for the Welfare Federation, I made up my mind to subscribe. That same day I turned on my radio set and heard a speaker talking about the Federation from one station. I listened to that first talk because I was sympathetic toward the movement to relieve the many cases of distress which are handled by the Federation.

Later on I tuned in another station and the first thing I ran into was another talk on the Welfare Federation. That same evening I tuned in on another talk. By that time I was getting tired of Welfare Federation. Then, day after day, when I picked up my newspaper to look over the radio programs, I saw every here and there more talk about the Welfare Federation. The thing was carried entirely too far. It was badly oversold. I did not contribute to the Welfare Federation although I had really wanted to.

The same thing was done some time ago by the backers of the proposed Sequi-Centennial celebration in Philadelphia. The very first thought of the committee in charge of their publicity was to use all of the broadcasting stations just as often as they could possibly get them. Fortunately, this committee asked

MAGNATRONS



large base

TYPE DC 199



TYPE DC 201A



miniature base

TYPE DC 199

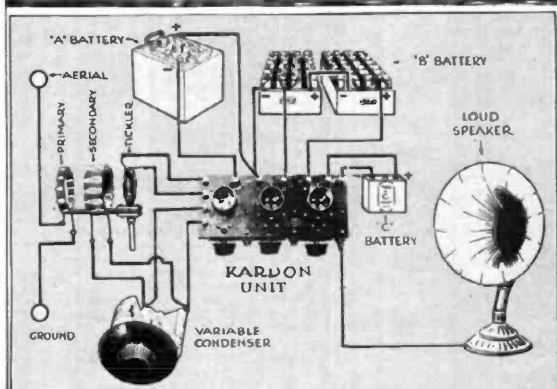
MAGNATRONS today are better tubes than they ever were—before and that is saying a great deal. MAGNATRONS occupy a front rank position among vacuum tubes; they know no superiors and very, very few equals.

MAGNATRONS have been changed both internally and externally. All types are now manufactured in the tipless form. This is an important feature; it greatly reduces the chance of accidental breakage. The bases, too, have been improved. Pure bakelite is used, thereby cutting down leakage and capacity.

The internal changes in MAGNATRONS make these tubes more fitted than ever for efficient radio frequency amplification and powerful audio frequency amplification without distortion. Convince yourself on this point by hooking a MAGNATRON into the circuit.

MAGNATRONS are made in three types—the DC-201A, the DC-199 with the miniature base, and the DC-199 with the large standard base. The list price of all types is \$4. Your dealer will be glad to show MAGNATRONS to you.

CONNELLY ELECTRIC LABORATORIES
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15 Wires and 15 Minutes Make a Loud Speaker Set

Only 15 wires and no soldering. Just a tuning coil, a variable condenser and A KARDON UNIT. There's your set. Hook it up and listen in.

IT'S BUILT IN 15 MINUTES

We're showing the hook-up here for any three-circuit tuning coil.

BUT

there's a Kardon ready-built unit for every circuit. Ask us about them.

KARDON PRODUCTS CO., INC.
 101 Varick Street, New York

GRIMES and His Famous INVERSE-DUPLEX SYSTEM

are found exclusively in
"Radio in the Home."
David Grimes is one of our
Associate Editors and
writes for no other publica-
tion.

Mr. A's attention to it as relieving them of all violation in the matter. This is done now in all requests that the directors get for what we call "point-to-point" communication. Lots of people who speak by radio for the first time want to say something directly to some of their friends. It is only necessary for the director to tell them that this is against the law and that ends the matter.

It is the same way with direct advertising. Many speakers will try to do direct advertising if they are not informed about this ruling.

Now it seems to me that it would be a very wise thing for the Department of Commerce to notify all broadcasting stations that special pleading of any kind is prohibited by radio. This ruling does not have to mean a single thing. It need never bother the radio inspectors in any way. But, if the store owner or the station owner had an official notification of this kind handy in his desk, he could simply show it to Mr. A whenever Mr. A came with his posterous requests. He would thus save Mr. A from hurting his own cause, he would save his own good taste in running his station, he would save his director's temper and he would save the friendship of the entire radio audience.

The Question of Dry Cell Tubes

(Continued From Page 6)

cent of the UV-199 tubes brought to us were defective. They would just about act as detectors and would be total failures as radio-frequency amplifiers.

At the New York show in the Grand Central Palace, I had a long talk with one of the officials of a company putting out a small portable set using the 199 tubes. I asked him what his results had been.

His statement to me was very frank. He admitted that a great many customers were writing that their sets were not satisfactory. He said that his company had gone to a great deal of expense to investigate all such cases and in virtually every instance it was found that the customer had gotten hold of a defective 199 tube, and consequently his set would not work.

This magazine, then, will continue to give hook-ups giving the standard sockets. In all such cases, you can use the hook-ups and apparatus just as given and, if you want a tube which can be operated successfully on dry cells, I will recommend for you the new Schicklering amplifier type S-900. This tube works on six volts and draws only one-tenth of an ampere from the battery. It is a standard base and uses a standard "B" battery.

With a drain of only one tenth of an ampere for each tube, this means that a ten-tube superheterodyne with these tubes could be operated from dry cells. This would give a drain of only one half ampere out of each dry cell and that is well below the normal rate of discharge for such batteries. The correct hook-up for the dry cells is given in this issue in the article on our two inverse duplexes.

This tube will give much louder signals, much better quality and is much more satisfactory in every way than the UV-199.

The Beginner's Best Bet

(Continued From Page 27)

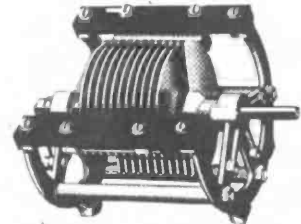
advise you all to read that article, and the beginner will be able to get a great deal out of it even though some of the discussions of low-loss design may be beyond him.

The Best "Low-Loss" Condenser at a New Low Price

Being designed by Flewelling himself, there was not much that we could add to this true low-loss condenser to improve it. It seemed that Mr. Flewelling combined all the good qualities of a condenser and discarded all the bad points when he built the original model.

But there was one thing we could change—the price! And we have. Through constantly increasing our production and distribution, we are now able to offer you a real reduction in the cost of the highest grade of low-loss condensers.

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**New
Prices**
.0005 mfd.
Condenser \$5.00
.00025 mfd.
Condenser \$4.50
(Vernier included
50c extra)

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Complete, \$1.50
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New York
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PACENT RADIO ESSENTIALS

SELECTIVITY—distance—volume—these results are dependent on the parts you use. It's pure economy to slight such vital parts as tubes, rheostats, condensers, etc., when Pacent Radio Essentials, built by the pioneer radio tube manufacturer, cost no more than inferior parts.

18 years of radio experience are back of every Pacent part. Over 30 of the leading makes of receiving sets are Pacent equipped. This is convincing proof that the Pacent trade mark stands for leadership. Let the judgment of these makers be your guide in buying parts. Send for our complete catalog.

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Philadelphia, Pa. Chicago, Ill. St. Louis, Mo. Detroit, Mich.

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RADIO ESSENTIALS**

DONT IMPROVISE — PACENTIZE

Opera at Home **RUBICON DUPLEX**

Full volume for combinations of voice and orchestra is the acid test of amplification. DUPLEX Push-Pull is so clear that you almost seem to be there.

"The Inside Story" tells why. Select your transformers—Radio, Audio, Power, Push-Pull and Supers—to suit your tubes. Full data. Just drop us a card.

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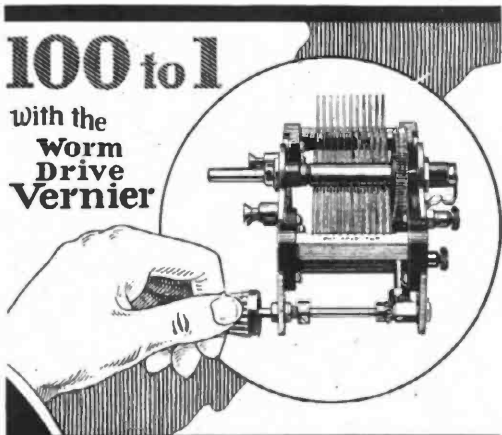
Duplex, pairs tested for balance \$12
Audio Frequency . . \$6.00
Radio Frequency . . \$6.00

AMERICAN BRAND CONDENSER

\$5⁰⁰
IN CANADA \$7⁰⁰

100 to 1

With the
Worm Drive Vernier



In justice to yourself you should examine the American Brand Condenser with the 100 to 1 Worm Drive Vernier before you finally decide which condenser you will put into your set. You will be agreeably surprised by its sturdy build—by its wonderful fine tuning possibilities—by its remarkable electrical qualities. Here is a real low-loss condenser that we guarantee to improve any set. Let your dealer show it to you.

Note to Dealers: Your jobber is now able to furnish you with American Brand Condensers.

American Brand Corporation
8 West Park St., Newark, N. J.

When Your Set Just Dies

It may have worked beautifully last week. Then it began to get weaker and weaker and tonight it's dead.

You've tested everything. Batteries are up, connections O. K., nothing shorted or open, aerial and ground all right. Yet the set's dead. The tubes light so they must be all right. Ah! but wait. Are you sure? The fact that they light proves that the filaments are all right, but what about the grids and plates?

Can you test your tubes?

It's easy and cheap—when you know how. Then you can spot that one bad tube that is killing your whole set.

Read: "How to Tell Good Tubes From Bad Ones"—May issue, Page 6.

"A Tube-Tester Any One Can Build"—June issue, Page 6.

"Tube-Testing Outfit As Used in RADIO IN THE HOME Laboratory"—July issue, Page 31.

Be sure your tubes are right before you blame your set

Send 30 cents for these three back issues and learn how to test your own tubes.

Circulation Department
RADIO IN THE HOME
608 Chestnut St., Philadelphia

Notes on Our Inverse Duplex

(Continued From Page 53)

ing with the loop known as the "Duo-Spiral" and has managed to get very good satisfaction with it. I myself worked with this little loop, but as it did not occur to me to attack the problem by the method adopted by Mr. Briggs, I felt that the only way to use this loop was to substitute a .0005 variable condenser for the first tuning condenser in the set instead of the .0003 as you now have it.

Mr. Briggs, however, has solved the problem as you will see by the quotation from his letter. Let me say here that I am glad he has because I found the Duo-Spiral to be a particularly good loop and especially appealing to the man who does not want a large loop in his house.

I quote from letter received recently from Mr. Briggs:

"I believe the special variable non-inductive resistance that the CRL people have made up for me completely eliminates the tapped loop and solves the volume-control problem in the I. D. N. I tried it out last night and was delighted with the results. Four hundred ohms, spread over about three-quarters of the arc, then 2000 ohms in the remaining quarter. The 400 takes care of most anything out of town, and the 2000 brings the local down well below the overload point. She slips perfectly smoothly from one into the other. I've canned the tapped loop for good, and am using a standard Duo-Spiral with the set.

"I am sending you one of these 'specials.' The man to write to about it if you want some other combination is E. E. Stoeckel, Central Radio Laboratories, 303 Sixteenth street, Milwaukee. Those people seem keen to co-operate with experimenters.

"Am making considerable progress with the various special coils Mr. Pfantstiel has made for me, but haven't time to report on them now. Experimenting considerably interfered with by birds who build inverse duplexes and leave out a plate lead or a grid return and then wonder why the thing doesn't work, and tote the set round to me. I am acquiring much gratitude, some reputation as a diagnostician, an ineffectual grouch from interrupted experiments and an aspect suggesting lack of sleep. All of which items are doubtless an old story to you!"

I'll say they are!

IN HIS articles on several inverse duplex circuits, Mr. Grimes has specified Jefferson Star transformers with the ratio three and one-half to one. This has evidently been a mistake. I quote from a letter just received from Paul Green, of the Jefferson Electric Manufacturing Company:

"I find that a mistake has been made in the Grimes 3XP circuit inasmuch as Jefferson Star transformers ratio three and one-half to one have been specified. I am inclosing one of our circulars which gives the ratio of each of our transformers. You will note that we have three different ratios in the Star transformers, namely, one and one-half to one, three to one and six to one.

"We have also had a great many letters from fans inquiring as to where they could buy the three and one-half to one ratio Star. We have no Star type with ratio 3.5 to one."

This was my mistake. The proper ratio to use with the Grimes circuit is three to one. H. M. N.

60 Ft. Aerial Mast \$45

30 Ft. Mast, \$10
50 Ft. Mast, \$35
We Pay Freight

All masts complete with wires and mast lead pulley. No concrete used in the foundation. Write at once for literature and large FREE technical blueprint.

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Will help you increase sales. Send for FREE catalog giving names and prices on thousands of classified names of your prospective customers, including new lists covering the radio field. Guaranteed by 5c each 99% refund of

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Use RESISTANCE!

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Grid Leaks **75¢**

Variable—The 100-500 ohm range—made in tubes. No. 100-1000—The 100-5000 ohm range. No. 100-10000—The 100-100000 ohm range.

Manufactured in England. All details on prospectus.

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The Real Low-Loss Coil

Adaptable to every reflex set. Designed to bring an absolute minimum of distributed capacity. Cuts down dielectric losses. No substance used to distort the reproduction when using these coils.

Mailed postpaid in the U. S. for \$2.00 a pair

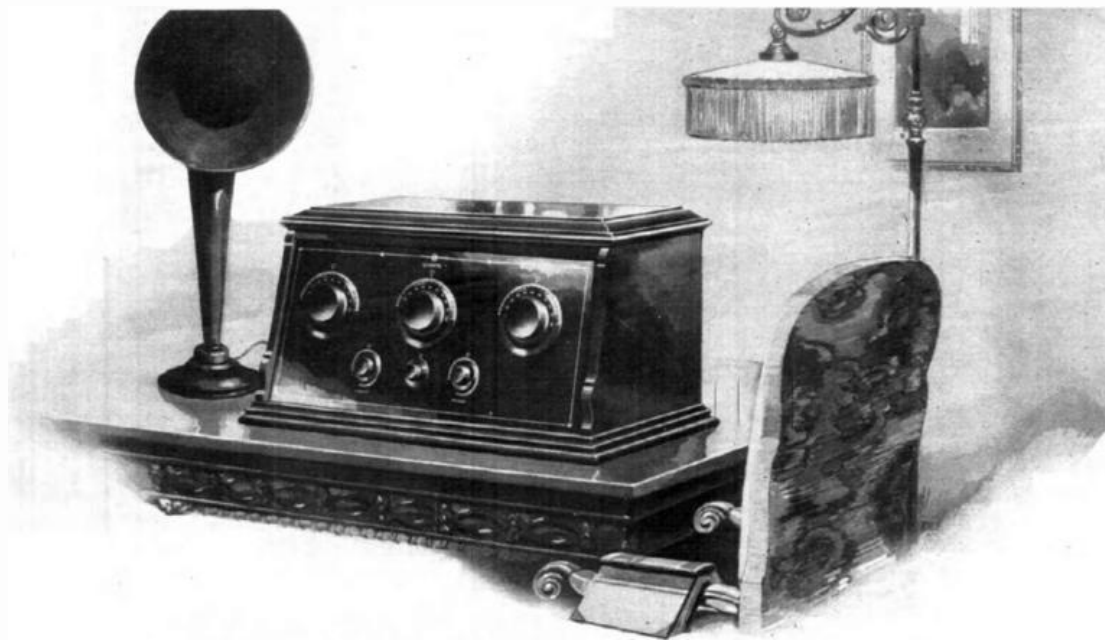
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You can't beat it for a neat job. It's No. 14 tinned copper wire with varnished insulation. Highly dielectric; moisture proof. Bends without cracking. Strips like the bark on a whistler. Looks like spaghetti, but is smaller. Five beautiful colors. Send for FREE FOLDER. "How to Solder" also describes "Celatsite" and other ACME products.

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Dept. R, New Haven, Conn.

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RADIO A NEEDS



The FADA Neutroceiver

will surpass anything you have expected of a radio receiver

VOLUME? The FADA Neutroceiver will give you all the controlled volume you can possibly desire. Designed to use powerful tubes and operate on either indoor or outdoor antenna, it is guaranteed to give powerful results.

Clarity? This wonderful five-tube Neutrodyne offers you a tone quality which is unexcelled. It reproduces every tone of the human voice and of every musical instrument with lifelike fidelity.

Selectivity? Separates stations, tunes through powerful local broadcasting and brings in distant concerts—even when their wave lengths are but a few meters apart.

Simplicity of control? Anyone, without previous experience, can operate the Neutroceiver. You can

turn your dials to previously located stations and bring them back night after night.

Beauty? As a piece of art-furniture the FADA Neutroceiver is a masterpiece. The cabinet is solid mahogany with the panel perfectly balanced and sloped gently to facilitate easy tuning.

Supplementing the FADA Neutroceiver and making a complete FADA line, are five other Neutrodyne receivers. Six models in all—three, four and five tube Neutrodyne receivers in plain as well as artcraft cabinets.

You have a range from \$75 to \$295 from which to select—each model extraordinary in results; each a remarkable value. We suggest that you see your dealer.

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No. 100-A

"The receiver that has taken the country by storm." The best known of all Neutrodyne, 4 tubes. Price (less tubes, batteries, etc.) \$120.

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FADA

Radio





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